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Pathology of the Mouth and Surgical Principles of Its Removal

WM. L. SHEARER, B. S., M. D., D. D. S.
Omaha, Neb.

THE definite establishment of the relationship between mouth infections and systemic disease has fixed a new responsibility on all of us. The sequellae following in the wake of pathological processes are so far-reaching that one can not treat the conditions, surgically, without considering thoughtfully, the different kinds of bacteria usually present. This phase of the subject will not be treated in this paper, for the reason that it has been thoroughly covered by Rosenow, Billings and others, and is easy of access to all. However, I wish to quote from Billing's work on Focal Infection, the following pages 125-126 and 135-136:

"The focus of infection which undoubtedly causes the streptococcus veridans bacteremia and chronic malignant endocarditis is often alveolar abscess. Of this we have had numerous clinical examples. Coincident cultures from the alveolar abscess and from the blood have yielded strains of the streptococcus veridans. When these nascent cultures were intravenously injected into animals, typical endocardial lesions resulted. Doubtless a focus containing this streptococcus may be located in the tonsil or nasal sinus or elsewhere, which may be the cause of the cardiac infection.

"In mild rheumatic fever, and in chronic infectious forms of arthritis the focal cause should be removed early. Even in these mild and chronic types of infections, arthritis and myositis, one occasionally witnesses serious results.

"A girl of eighteen, who had suffered for a year from a disabling chronic polyarthritis and myositis, due apparently to multiple chronic alveolar abscesses, had many teeth extracted and the alveolar abscesses curetted. Streptococcus bacteremia developed

with acute hemorrhagic myositis, pleuritis, pericarditis, myocarditis with submucous and subcutaneous hemorrhages and death. The streptococcus isolated from the muscles, when injected intravenously into animals caused rheumatic arthritis, myositis, endocarditis and pericarditis."

"A girl of ten, a patient in the Presbyterian hospital, suffered from a mild arthritis and myositis. The family physician had the enlarged and apparently infected tonsil removed. Immediately there developed an acute general myositis, which gradually changed to a non-febrile type with much deformity, due to the shortening of the muscles. Experience of this kind affords proof of the focal origin of certain systemic conditions and that the operative technique of removal of foci of infections should be of a kind which will

Figs. 1, 2, 3, 4, illustrate the complete external alveolectomy.

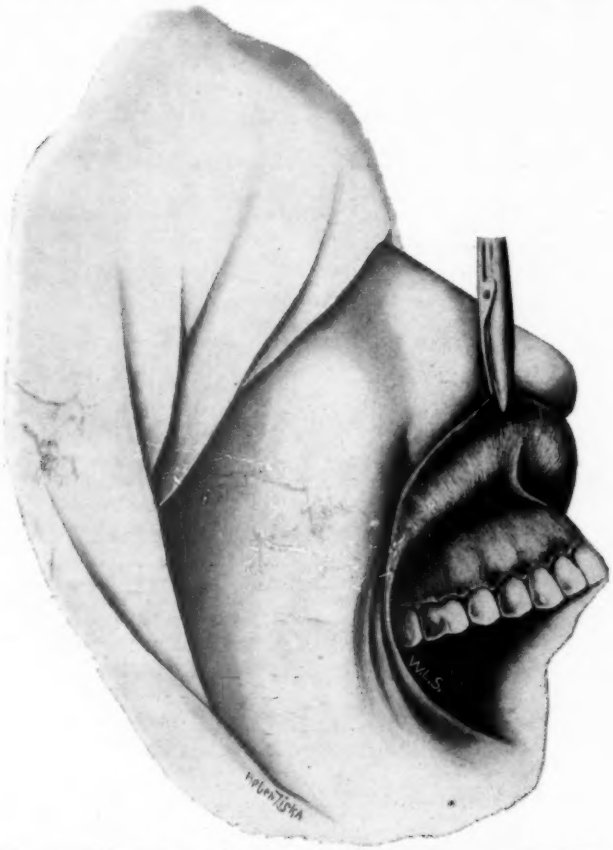


Fig. 1—Diagramatic of the superior maxillary. Assuming that the pathology of the teeth and body of the jaw requires the removal of all the teeth.

not overwhelmingly inoculate the patient. In acute rheumatic infections, the removal of the original focus, usually tonsilitis may not prevent future attacks, for the streptococcus rheumaticus may occur in other focal sites, not-

Fig. 2—Illustrates case after the removal of the teeth, the mucoperiosteum denuded from the bone and lifted upward and above the root ends of the teeth.

ably in alveolar abscesses and maxillary sinusitis. The prompt removal of every recognizable local infection of the head in people who suffer from repeated attacks of acute rheumatism may prevent the disease. This result, experience of recent years has conclusively proved."

In this connection it is important to note the lymphatic drainage of the jaws. So far as I am able to learn, the lymphatic system of the jaws was presented first by Dr. Frederick B. Noyes and Kaethe W. Dewey, of Chicago, before the 69th annual session of the American Medical Association, June, 1918, from the standpoint of histology only. Then, in December, 1918, "The Lymph Drainage of the Jaws," from the standpoint of focal infection was presented by Dr. Albert D. Davis before a meet-

ing of the Anatomical Society of the faculty and students of the University of Nebraska College of Medicine. In April, 1919, I read a paper on the same subject before the Omaha Roentgen Society.

sense than a menace to the health. Not enough serious thought has been given to mouth pathology. Not enough thought has been given to surgical principles dealing with certain pathological problems of the mouth. The

Fig. 3—The muco-periosteum reflected up to the root ends of the teeth and the external alveolar plate along with diseased tissue attended to under the eye. The lingual, buccal, gingival mucosa trimmed. No jagged bone edges are left.

Fig. 4—The muco-periosteum carried back into position and sutured with horsehair. I advise continuous horsehair suture in the hands of those experienced, either buttonhole or over and over stitch.

The members of the allied specialties of medicine are awakening to the fact that better management of the morbid processes of the jaws is necessary. It certainly is up to the specialist of dentistry to devise means of successfully treating these conditions of the jaws. Unfortunate as the loss of certain or all the teeth may be, it is entirely justified when combating such foci which can be considered in no other

surgical technique has been sadly neglected. Too much operating has been and is being done without a sufficient knowledge of the pathology present. Too often the pathology is not removed, and as a consequence, if recovery followed, it was in spite of us and not because of us. As a result, many have discredited the true relationship of mouth infection because of the unhappy results. Great good will result from our

coöperative work when we better understand pathology of the mouth, and better and more thorough surgical principles are employed. It has been my privilege to observe both the clinical and operative end results in a large series of cases representing the various systemic manifestations with which mouth infections seem to be associated. When

Figs. 5, 6, 7, illustrate partial external alveolectomy.

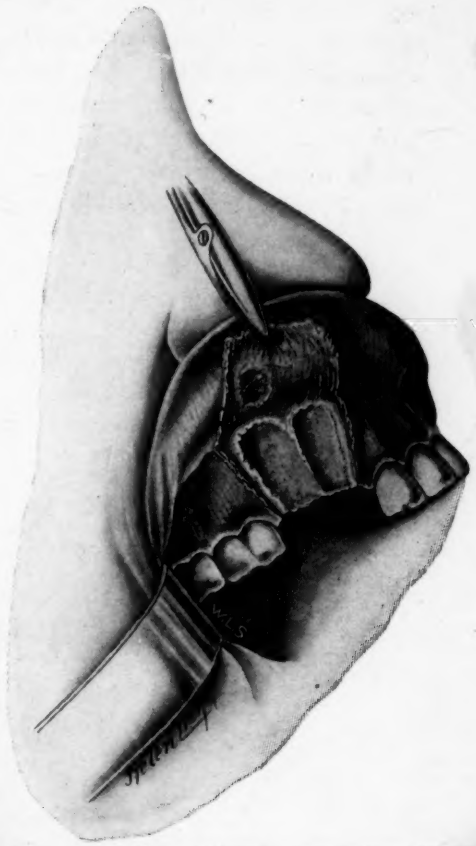


Fig. 6—Partial external alveolectomy ready to close.

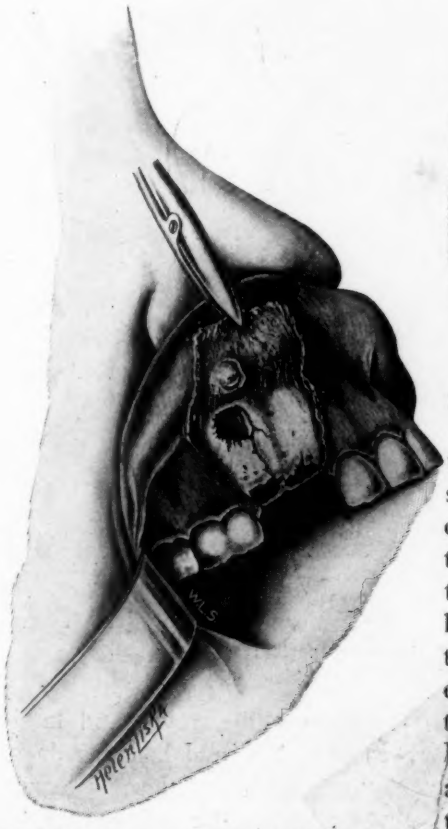


Fig. 5, shows conditions of the bone often revealed after the flap is laid back, the granuloma attached to the muco-periosteum. It is necessary in many instances to employ the knife in order to remove the diseased tissue.

we critically examine the end results of the old operative procedures, we are convinced that they have failed in their objective. We have been content, heretofore, with the mere extraction of diseased teeth. The inefficiency of this procedure, I think, has been definitely proven. Radiograms taken some time after the usual methods of extraction had been employed disclosed unmistakable evidence of failure in our efforts to remove disease. Remaining osteomyelitic

areas, granulomata, etc., have been definitely shown in several cases when all the teeth had been removed ten, fifteen or even twenty-five years previously. These were proven at operation. Furthermore, the systemic reactions following these procedures, especially when the extractions had been numerous, and the curettements extensive, were at times alarming, as shown by the case cited by Billings above. The tooth sockets drained for days and weeks with a foul discharge, which oozed from the reddened, inflamed gums and responded slowly to any form of treatment. In addition to the local disturbance, systemic reactions frequently occurred, which were manifested by chills, fever and lassitude, which would last for days. Increase in the leucocyte count was common. It required months for the alveolar process to become smooth enough for the comfortable wearing of a plate.

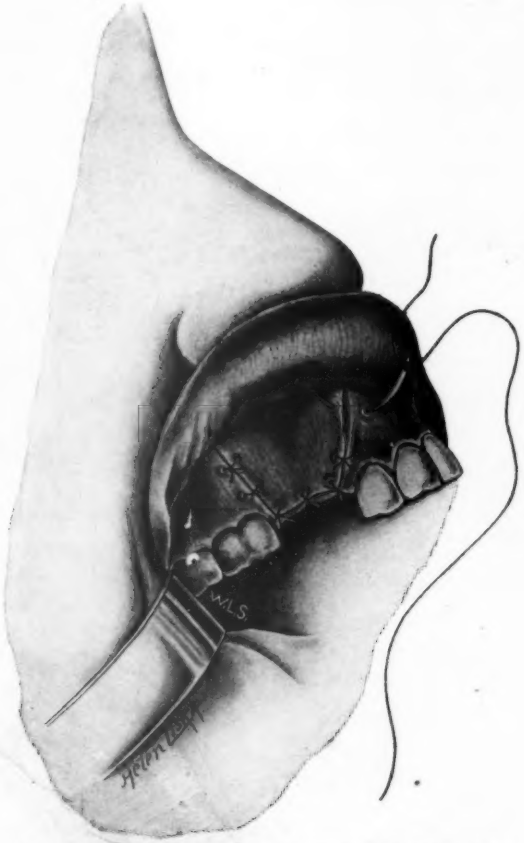


Fig. 7—Replacement of the muco-periosteal flap into proper position.

These failures and complications can be easily explained when we appreciate that in treating chronic dento-alveolar abscesses and their contiguous diseased areas we are dealing with chronic osteomyelitis of the jaw bone and that the major portion of the pathology is in the bone and not in the tooth. As I have said many times in former papers, mere extraction disregards the fundamental principles of bone surgery. We know well that bone surgery demands the removal of dead bone, removal of granulomata and collapse of the bone cavity as far as possible. I do not believe we can too strongly assert that the end results of an operation and the realization of the desired results by the physician and patient depends upon the certainty with which the entire pathology is removed. Failure on our part to completely remove the pathology promises just as uncertain results as when the laryngologist fails to completely remove the diseased tonsil which has been acting as a focus of infection. The responsibility incident to coöperative medicine and surgery must be given more serious thought in the light of many of our failures.

In 1905 I designed an operation for the complete removal of the external plate of bone from the jaw in order to facilitate the fittings of more pleasing dentures. Later I employed the operation extensively for the complete and certain removal of mouth pathology. The technique of the operation is as follows: The teeth are removed, the muco-periosteum is reflected up to the root ends of the tooth sockets the external alveolar plate of bone is taken off, the diseased tissue is attended to under the eye. The bone is smoothed, leaving no jagged edges, the lingual, buccal, gingival mucosa trimmed and sutured with horse hair. The sutures are removed in from four to five days. Special instruments, such as rongeur forceps of different kinds, chisels, etc., are needed. To better satisfy certain steps of the technique, I designed a special rongeur forcep, which, it is hoped will be found useful to those doing this class of surgery.

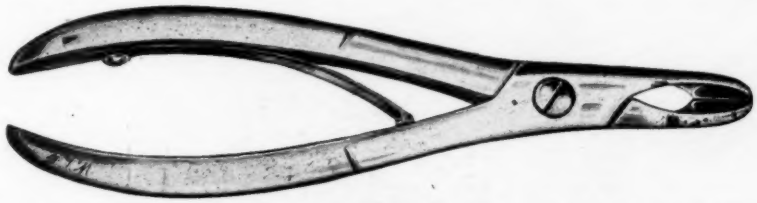


Fig. 8—Special rongeur forcep designed to better carry out certain steps of this class of surgery. Presented to the profession for what it is worth.

The removal of two or three chronically abscessed teeth, at a

time, waiting ten or twelve days, then continuing the procedure, vaccinating the patient each time, is bad therapeutics. It is the continued vaccination of the patients due to liberation of the toxins of the organisms in the blood stream which we are endeavoring to relieve. They have been vaccinated daily for from one to forty years or more, by the presence of the infection, so why continue the offence in the hope of relieving them? The systemic manifestations are only exaggerated and often made worse by such methods. We might just as well remove part of an appendix and later go back and get the rest of it, providing the patient still lives. Febrile reaction following such a seemingly radical operation as described above for the removal of infection is almost always absent.

A very large proportion of the chronically infected maxillary sinuses are of dental origin. Infections of the maxillary sinus are often chronic due to faulty drainage, and only when a new cold is acquired do they present local symptoms. In many instances the predisposing etiological factor is drainage into the sinus from a dento-alveoloar ab-

Figs. 9, 10, 11, 12, illustrate different stages of the operation for the removal of imbedded and impacted teeth, lying in the roof of the palate distally to the roots of the teeth.

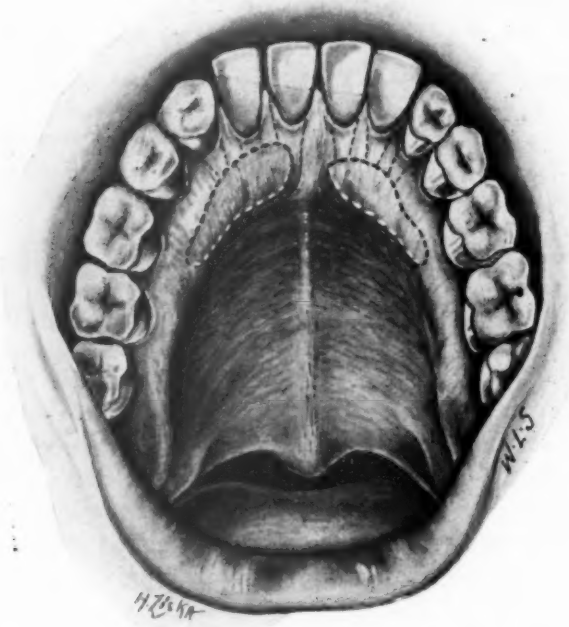


Fig. 9—Diagramatic of imbedded cuspid.

scess at the root ends of non-vital teeth. The following fundamental principles should govern our treatment of chronic infection in the maxillary sinuses.

A. If they are of dental origin, the dental pathology should be taken into consideration and removed.

D. One which would present the least annoyance to the patient should be employed. One which would have the greatest respect for the anatomy.

E. In the event unhealthy granulations occur during the process of healing an operation should be employed whereby the

Fig. 10—First step in operation. Incision is made close to the teeth, leaving just enough muco-periosteum to suture to. This incision involves only the terminal branches of the descending palatine artery and thereby avoids excessive hemorrhage.

B. A well established drainage must be considered.

C. The type of operation, of choice, it seems, would be one whereby an ocular observation of the entire antral cavity could be had. (This would be especially necessary where polypi were present.)

antral cavity could be easily reopened and examined.

G. In some cases where the antrum heals with considerable contraction of the tissue, a slight operation should correct.

One type of operation is not sufficient in the proper handling of infected maxillary sinuses

They must, in my opinion, be designed and carried out in accordance with the findings.

Vitality of teeth in close proximity to the floor of the maxillary sinus is too often destroyed, in different operations on the maxillary sinus by men who are not familiar with dental anatomy. which are demonstrated by drawings.

Imbedded Teeth: Imbedded cuspids and bicuspids lying under the nose and distally to the front teeth and hard palate, present one of the most difficult surgical problems, due to anatomical relationships, blood and nerve supply.

Fig. 11—Illustrates the condition of the bone trimmed and smoothed, leaving no jagged edges after the removal of the teeth.

With some of the old operations upon the maxillary sinus, for chronic infection, a greater damage has resulted to the patient than that for which they sought relief. I have designed different operations to approach the sinus which, it seems to me, present the least post-operative complications of any yet given, all of Neurological complications accompanying imbedded teeth of the different forms are past our recognition. To properly remove this type of imbedded tooth requires great care, not to destroy the adjoining teeth. Some of the complications of the old type of operations were excessive sloughing, bleeding and depression in

the hard palate. Often the sac which encapsulates an imbedded cuspid of this type, where left in the body of the bone, serves as a nidus for a subsequent cyst or growth.

Impacted lower third molars: By the old technique of the removal of impacted third molars with the pick-ax and crow-bar method, great damage has resulted. I am convinced that no one will criticise my nomenclature in describing many former techniques employed in the removal of imbedded and impacted lower third molars. Countless thousands of people have suffered irreparable damage by the so-called pick and crowbar methods. In former years no definite design of operation has been presented which met all the requirements incident to a careful surgical technique. Where the third molar is wedged against the second in such a manner as to preclude its removal by different elevators without serious damage, it presents a most difficult surgical problem. Undue injury to the following nerves, the mandibular, lingual and chorda tympani, often resulted by employment of poor surgical technique when removing lower impacted and imbedded third molars. It is this type of impaction for which I

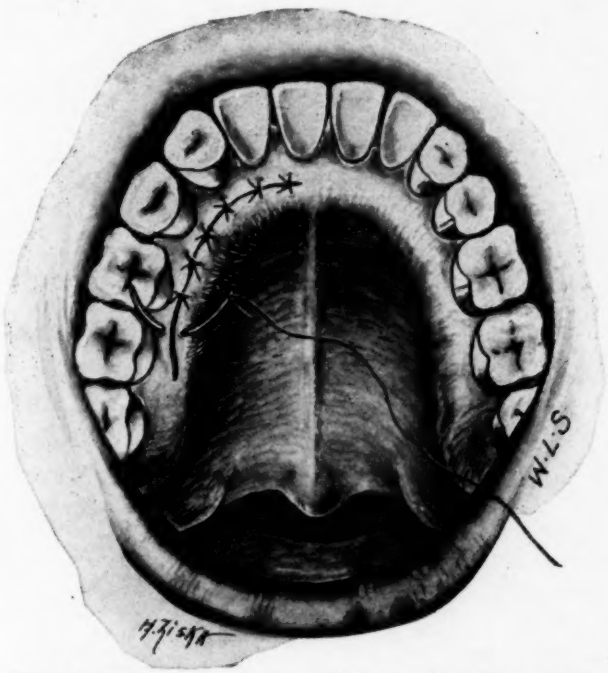
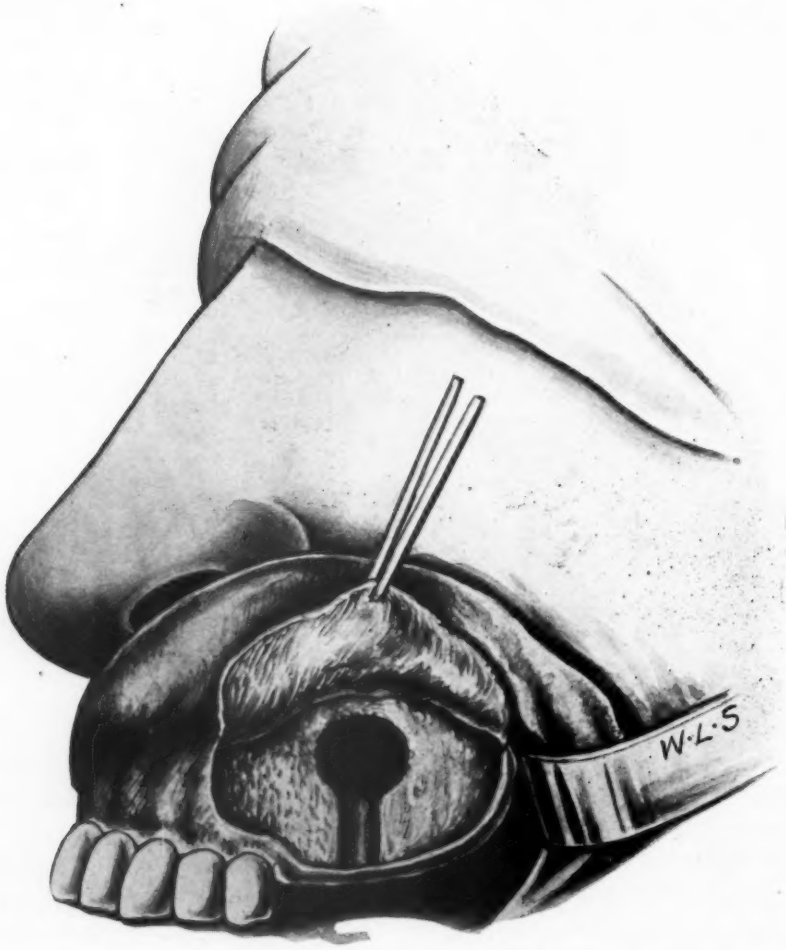


Fig. 12—Closing of the muco-periosteal flap with horsehair. With this technique there is no depression in the palate and usually no sloughing.

designed an operation which is illustrated by drawings.

Too often the cemento-enamel junction of the second molar is permanently injured and destroyed so that following in the wake is a pyorrhea pocket which results in the subsequent loss of a useful member of one's masticatory apparatus.



Figs. 13, 14, illustrate steps in method of approaching the maxillary sinus, where there are one or more teeth removed. In this way an ocular observation of the maxillary sinus may be had. A small groove is chiseled in the body of the bone, which permits of drain plug. When the patient recovers there is scarcely an indication of an operation having been performed.

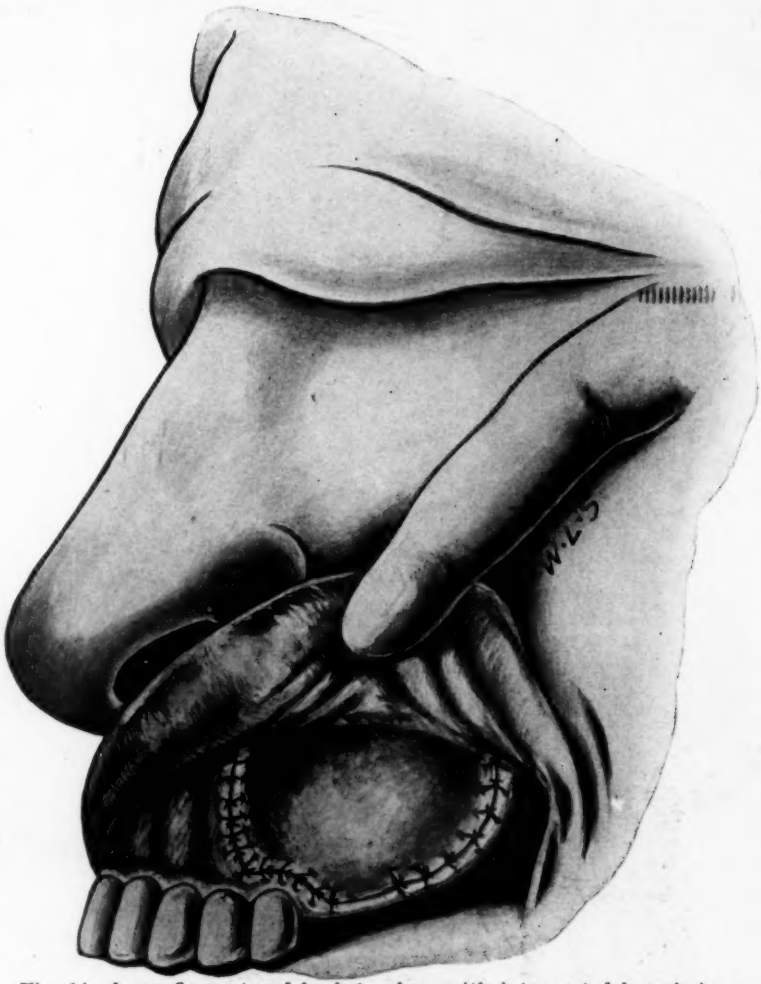


Fig. 14, shows flap sutured back in place with interrupted horsehair, a few stitches omitted at the site of drainage.

Figs. 15 and 16 illustrate an operation designed to remove the bony floor of the maxillary sinus when diseased, such as a chronic osteomyelitis, leaving the mucous membrane intact.

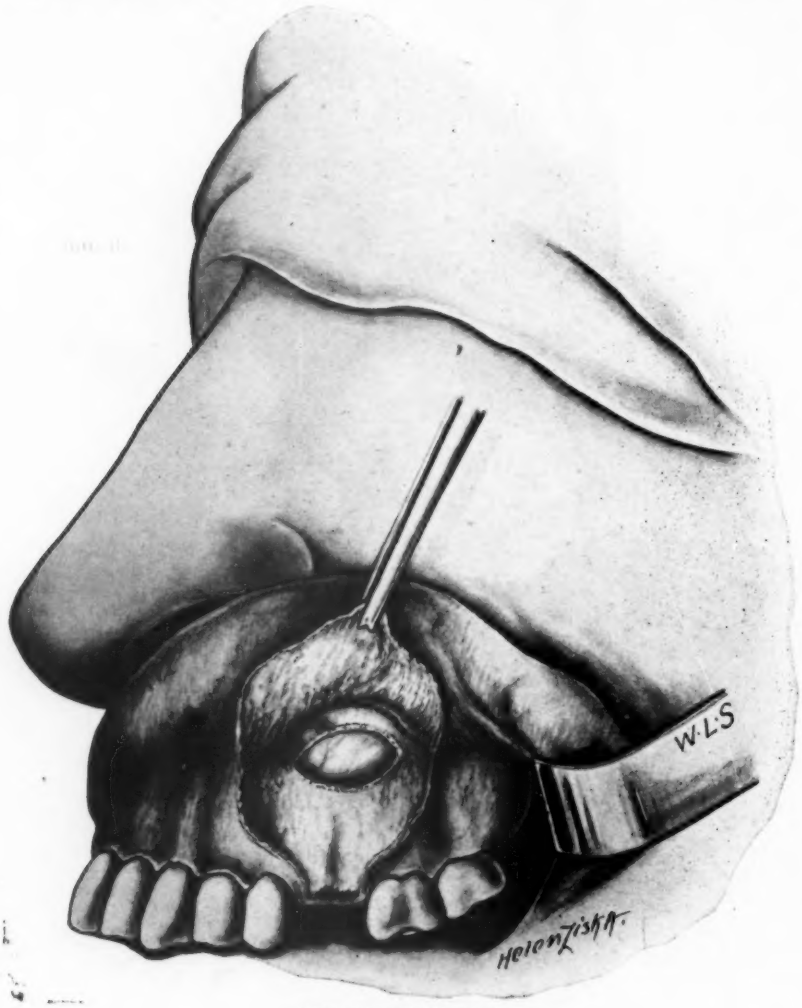


Fig. 15—First step.

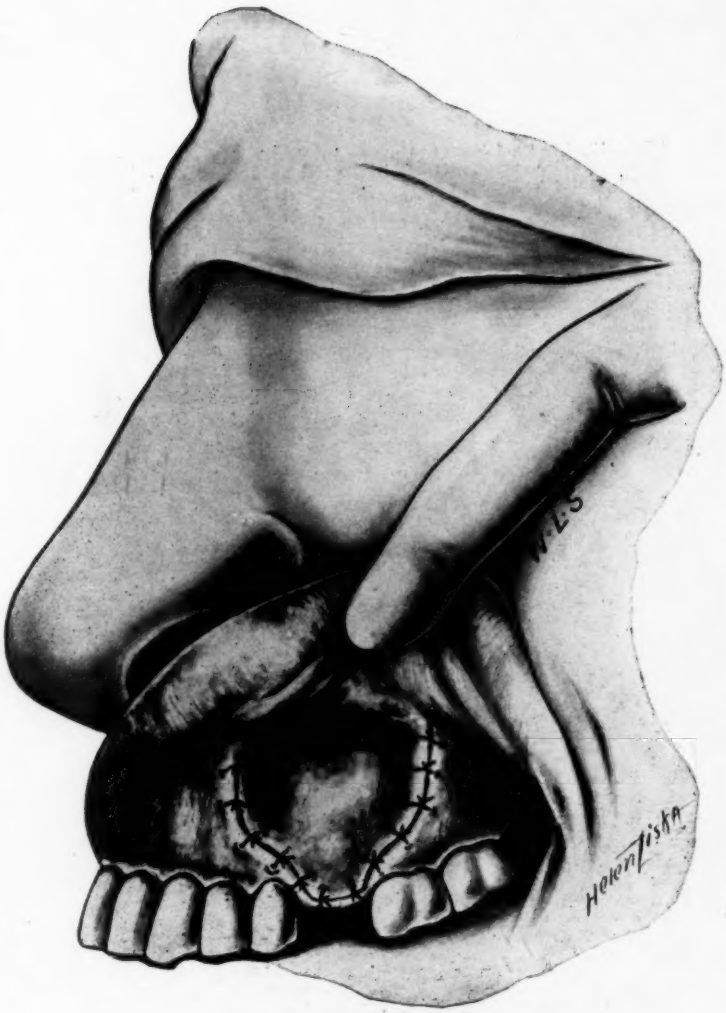


Fig. 16—Operation completed.

Figs. 17, 18, 19, illustrate steps in the design of an operation for the removal of impacted and imbedded lower third molars.

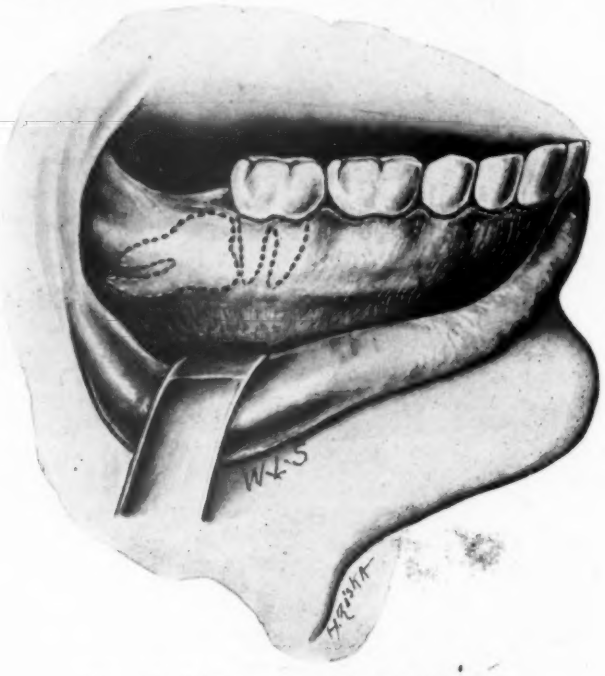


Fig. 17—Diagramatic of imbedded tooth.

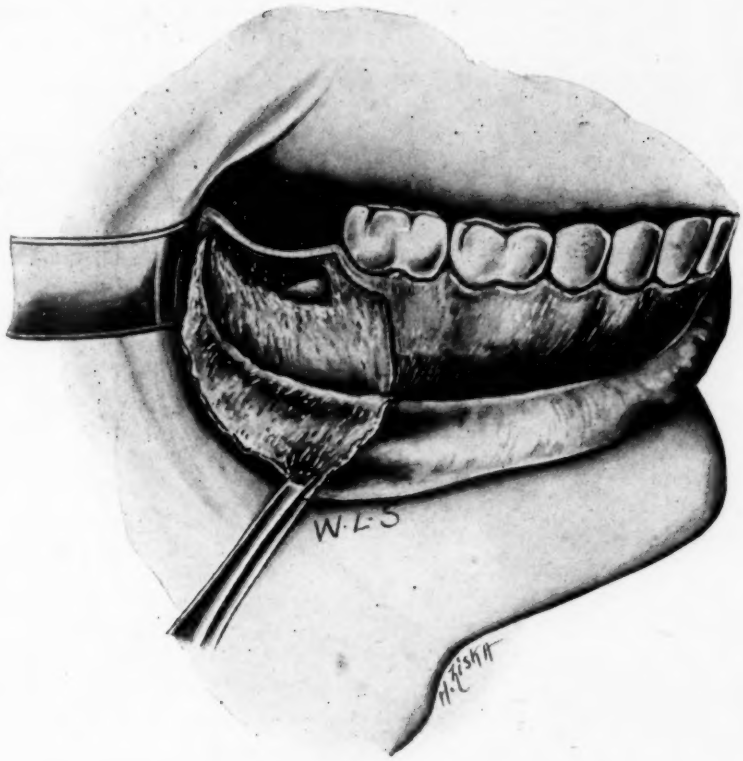


Fig. 18—First step in showing line of incision.

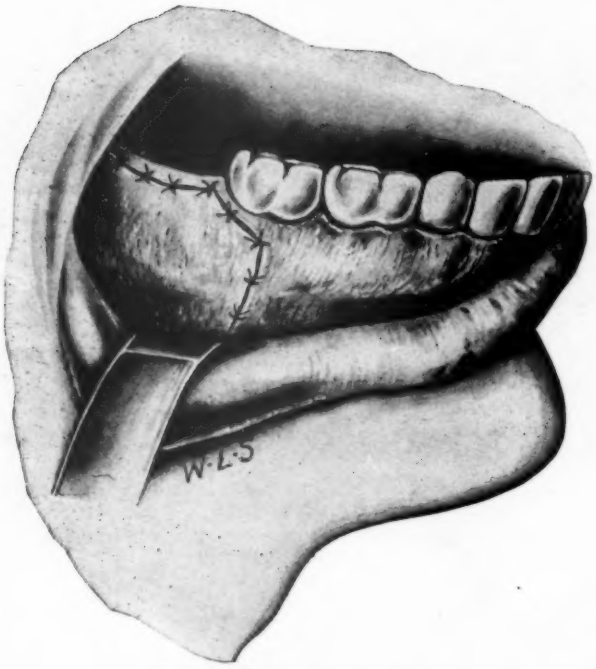


Fig. 19—Finished operation.

Figs. 20, 21, 22, show plaster models of sharp alveolar margin found several years after ordinary extraction in patients unable to wear plates. The muco-periosteum is laid back and this sharp ridge removed with the rongeur forceps. The pain is relieved and plates can be worn comfortably.

Fig. 20, shows very clearly the condition of the ridge of the mandible two years, four months after the universal method of merely extracting the teeth, with no further attention given.

The Alveolar process, being a transitory tissue, after the teeth are removed, gradually fades away. In the fading process there is a collapse of the center of the alveolar process and the buccal and lingual surfaces collapse, as it were, like a couple of boards being pushed together, thus leaving a knife edge of very hard, bony process, which is lacking in blood supply. It is this knife edge of bone which accounts for the severe complications so many people have in wearing artificial dentures.

The condition as shown in this model is a condition I have observed after cutting down upon the center of the ridge of the edentulous mandible of five hundred and twenty-seven cases, ranging all the way from one to ten years after the teeth were removed.

Fig. 21, shows condition of mouth after alveolectomy has been improperly performed. In this case only part of the external alveolar process was removed. If external alveolectomy is properly performed, the internal and external alveolar process should be removed.

Fig. 22, shows clearly what happens to the process a year or so after the teeth have been removed.

The Roentgenologist and Group Medicine

F. S. Bissell, M. D.
Minneapolis, Minn.

THE need of a radical change in the fundamental conditions under which medical men have been trying to accomplish the greatest good was sharply emphasized by the great war and its aftermath. It has become axiomatic that there is a close interdependence between men, as between countries, between groups of men, as between individuals. It is no longer possible for the individual within such a group as the medical profession to go the even tenor of his way without at some point establishing intimate relations with other members of the same group. Neither will the profession itself thrive and flourish unless it so organizes its activities that they may become as accessible and as adaptable as possible to the public need. A study of social progress reveals well defined eras or periods many of which have their apparent origin in war. Medical history follows the same law. The period which has just passed may be designated the era of specialization, while that now dawning may be known as the era of coördination of specialties, or the era of medical coöperation. For it is inconceivable that the demand for efficiency and economy will not require the medical profession to so coördinate its manifold and intricately variable functions that there may be less wasted energy and more service to mankind. There is already a marked tendency toward state medicine and this tendency will become progressively accentuated unless the profession recognizes and meets a self evident need for greater efficiency in practice, less commercialism and more unselfish service.

The development of new methods of diagnosis and treatment of disease has brought with it infinitely greater responsibilities which can be met and transformed into opportunities only through close coöperation of coördinate branches of medical practice.

Let us apply the principles employed in present day practice of medicine to the manufacture of an automobile. The prospective purchaser would go to a body maker to buy his body. This manufacturer would give him a letter of introduction to the wheel maker, who would refer him to the motor manufacturer, who would send him to the carburetor

establishment, whence he would find his way to the maker of electrical devices. Having now spent all of his available funds, he would trade the useless, half built conveyance for a cheap bicycle, fully assured that all manufacturers were thieves or fools, or both. Is this experience unlike that of the patient who is referred from one specialist to another each without any clear conception of what the others have done, until utterly discouraged and nearly penniless, he turns to the charlatan, who makes a positive if falacious diagnosis and an equally definite promise of cure.

The fact that charlatanism and medical mysticism never flourished as abundantly as they do today should be accepted by us not so much as evidence of ignorance and gullibility on the part of the public, as of our own shortcomings and failures to make the most of the rich opportunities which have been ours. For surely we are liberally endowed. The standards of medical education have been raised to a high plane and the researches of both European and American scholars in medicine have added greatly to the fund of knowledge which is our most priceless asset. Yet it is a daily experience of every practitioner to meet patients who have passed through medical hands without careful study and undiagnosed. The exploratory operation is still in vogue, either openly or under the guise of bizarre and snap-shot diagnoses. In short, it is perfectly apparent to any one who has not adopted the comfortable habit of the ostrich that we as a profession are not using our talents to the greatest advantage. Yet this criticism of the whole does not apply to the individual average. Never have we been blessed with such highly trained specialists, with such worthy ideals and sincere purposes.

Specialization in medicine has had a Topsy-like growth. The earlier conception of the specialist was that of one who devoted himself to a definitely circumscribed branch of medicine and who kept himself *a courant* with the studies of others in the same field. Thus the oculist became an authority upon everything pertaining to the eye, the gastrologist to the stomach, and the proctologist to the rectum, and the man who treated every subject with equal superficiality was regarded with distrust, at first by the profession, then by the laity.

The surgeon symbolized the first departure from this conception of the specialist. The rise of surgical procedure during the era following Lister required that men be specially trained in the use of the knife and in asepsis. The method of treatment rather than the specific organ or part of the body here constituted special-

ization. The internist, too, became a specialist in the same sense, basing his claim to specialization, not so much upon a limitation of his sphere of special knowledge as upon his greater knowledge of the whole. His mental energy instead of being concentrated upon definitely circumscribed material is widely dispersed over the whole field of human physiology, chemistry, anatomy and living pathology. His only limitation was that imposed by other specialists, since it was unnecessary for him to possess more than a superficial knowledge of the eye, ear, nose and throat, of the skin or of any surgical procedure.

Thus the internist was carrying a heavy load and was already feeling the need of a division of labor when the discovery of the roentgen rays with their wide application to diagnostic problems opened another large field of medical study and investigation. This was a study which called for qualities of mind training and temperament which the internist did not possess, or failed to develop, and for a time the field was neglected except by physicists and a few medical men with a genius for mechanical manipulation. Gradually, however, diagnosticians of the highest training were attracted by the glorious vista of the roentgen ray future in diagnosis and became absorbed in its study. And as its possibilities rapidly expanded into probabilities and then into scientific accomplishments, it became apparent that here, indeed, was a new specialty of medicine, one which would demand and reward the undivided thought of the most highly educated minds. And, as we review the history of roentgenology we find that it differs in no sense from that of other human activities and that its advances have been due to the efforts not of the dillitante, but of the specialist.

We who are gathered here from all parts of North America believe that progress in roentgenology has but begun and that as the science expands into greater maturity, the glorious achievements of the past will be credited to its period of infancy. In this period barber surgery is repeating its manifestation in the person of the technician roentgenologist. Not the pure technician or operator who fills a useful function in performing only non-medical duties in the roentgen service, but the technician who attempts through the agency of the roentgen ray to diagnose and treat disease of which he has no fundamental knowledge.

The roentgen therapist or diagnostician should be as thoroughly trained in all of the fundamental branches of medicine as the surgeon or internist, and must be afforded the same protection if he is to maintain a like stature. Yet

it is not unusual to see learned professors of medicine or surgery, apparently devoid of a saving sense of humor or the fitness of things, seek the opinion of a man whose sole claim to medical knowledge is his ability to manipulate an x-ray switch board, relative to such complicated diagnostic problems as bone tuberculosis or pulmonary cavitation Or the surgeon who will fearlessly attack a breast cancer following the lymphatic chains with a skill born of anatomical knowledge, rely upon the judgment of a common school technician to administer a lethal dose of roentgen rays to the remaining cancer cells.

The writer believes that failure to include roentgenology as a specialty coördinate with internal medicine is an inherent and fatal weakness in most of the group clinics which are being developed in such prodigal numbers since the war. For whether this exclusion is prompted by necessity, expediency or economy, it makes impossible the attainment of an ideal efficiency, the avowed aim of group medicine. If there is need for this new form of organization, it is founded upon a demand for more perfect coördination of all medical activities to the end that the interests, health and lives of patients may be better safeguarded.

When, therefore, any motive other than that of efficiency prompts the exclusion of any specialty, the group begins to fail to be a symbol of progress and tends to become merely an agency for the material betterment of its own members. The usual group clinic is composed of a small number of highly trained specialists, each with a lay following which is appraised as a valuable asset contributed to the organization. Since the nature of roentgenological practice makes it distinctive as a pure consulting specialty, the roentgenologist has no lay following to bring into the group. He, if successful, must derive his support from a large number of specialists and general practitioners, and he well knows that this support would not follow him into a group clinic. Nor could he hope long to remain content with the more restricted clinical opportunities which the clinic could offer him.

Hence, the group clinic is usually impelled by expediency either to eliminate the roentgenologist entirely or to hire a beginner, who through lack of broader opportunity must inevitably find himself laboring under a handicap on account of his group connection. Thus, since a chain is only as strong as its weakest link, the clinic begins its career as a new-born child with spinabifida or cleft palate. To exclude the roentgen laboratory as well as the roentgenologist would be too patent a confession of inadequacy

and each member of the group is thus compelled again by expediency to become his own roentgenologist. While this may prove an advantage in certain isolated instances, it surely does not promote that refinement in specialization which is so essential to modern diagnosis. The internist who spreads his talents over too wide a field is in danger of becoming a dillantante. If roentgen diagnosis becomes his hobby, all other diagnostic agencies will be made subservient to it, whereas, if it fails to become an obsession, it will indeed be a hobby which he rides but does not feed.

It is not the writer's purpose to disparage the laudable efforts of any specialist to keep himself informed in roentgenology, but merely to emphasize the danger of self-deception in any attempt to extend a specialty over too broad a field. For it must be apparent to all active practitioners that not only internal medicine but roentgenology must be subdivided if specialization prove true to its aim toward concentration of thought and effort. Who among us does not daily feel his inadequacy to meet and solve the infinite variety of medical and surgical problems which is poured into the hamper of the busy x-ray laboratory.

But if these great specialties are to be subdivided into smaller component parts, it is even more essential to efficiency and progress that the various subdivisions be closely coördinated, not only with each other, but with all other branches of medicine and surgery.

So long as the evil influence of competitive commercialism tends to guide the destiny of the profession, such coördination is admittedly difficult. But if competition can be confined to scientific attainment, then coöperation in practice, founded upon a solid foundation of confidence, will become universal, because it is essential to a satisfactory solution of the intricate problems of modern medical practice.

If we assume that some form of coöperative medicine is to be desired and that group medicine, as ordinarily conceived, only partly meets the problem, it becomes incumbent upon us to devise a mechanism whereby our ideals may be attained.

It would seem almost self-evident that such an attainment is possible only through the establishment of a common clinical center in each city or community. For the sake of illustration, let us style this the "Clinic," and the organization housed therein the "Clinical Association."

The privilege of becoming a member is open to any doctor of medicine who is strictly ethical in his practice and who is elected to membership by the board of trustees. By joining the associa-

tion he does not lose any of his independence, but may continue to practice exactly as in the past if he desires to do so. He is merely required to purchase a certificate of membership upon which a cumulative annual dividend is paid. He is also required to sign a pledge to avoid all unethical practices and to abide by the rules and regulations of the association. Within the clinic there is established a fiscal department under the headship of a capable business man. It is his function to manage the business affairs of the clinic, including the determination and collection of fees from those who are treated as association cases. The department has the most modern facilities for keeping the accounts, rendering statements, etc., for individual members, thus saving them the expense of a private bookkeeper. Through his credit associations he is able to keep members informed as to the credit standing of their patients, so that all charity work may be done knowingly. The scope of the activities of this business department may be widened to include safeguarding the investments of members as well as those of the association itself if this seems advisable to the trustees. With a membership of one hundred or more, such a department would not only be self supporting, but would be an important contributor to the treasury of the association.

The division of clinical laboratories thoroughly equipped and manned to do the most refined and dependable laboratory work of all kinds, should have at least two subdivisions, chemical and pathological. The heads of these subdivisions must be selected with the greatest care and paid adequate if not generous salaries. All fees for laboratory service are charged to the member requiring the same, and a liberal discount is allowed for their prompt payment the first of each month.

In the division of roentgenology all equipment is owned by the association and is kept in the highest possible state of efficiency. At least three subdivisions should be provided for and allowed to develop as soon as the volume of work justifies them. These are:

(1) Heart and lung diagnosis.
(2) Abdominal diagnosis.
(3) Therapy including radium.

Other subdivisions may be:

(4) Bone diagnosis, including the skull and sinuses.

(5) Urological diagnosis. in charge of an accomplished cystoscopist.

The financial policy should provide that a liberal percentage of the net earnings of the department shall go into the association treasury. One roentgenologist may be made general supervisor to coördinate the activities of the various subdivisions, but each sub-head should be

the supreme authority over his own subdivision.

Each sub-head is expected to make frequent visits to the world's radiological centers, to bring home successful ideas and incorporate them into the daily work of the department. The expense of such trips should be borne by the department and the duties of the absentee carried on by other workers in this division. In this way the roentgen ray department will be kept in the vanguard of progress. Just as each department head in any great mercantile establishment is required to make his department a paying one, so will each subdivision of roentgenology be expected to stand upon its own merits. Since the department is conducted upon a strictly coöperative basis the need or desirability of the small inadequate private x-ray installations will be eliminated, and with their passing a great economic waste will have been stopped.

Any member of the association who prefers to make his own roentgen examinations without the assistance of the roentgenologist will be offered all of the facilities of the department for doing so. Trained technicians and operators will be placed at his service, and only when the advantages of roentgenological consultations become obvious to him is he under the slightest moral or other obligation to resort to them. Thus the roentgenologist will be placed entirely upon his merit and roentgenology as a diagnostic specialty will stand or fall according to the ability of the roentgenologist to make himself indispensable. Are there any here who would question that ability, if he is given such a fair and unprejudiced opportunity?

A highly important feature of the roentgen department is the plate reading room. The appointments here should be such as will invite liesurely relaxation on the part of visiting doctors. Here, in a quiet, spacious room, out of immediate contact with patients, but with their clinical problems visualized before them in the roentgenogram, men will be encouraged to discuss their cases freely and confidentially to the common advantage of themselves, their patients and their confreres.

One of the obvious advantages of group medicine is the free interchange of ideas between various specialists, the fee therefor being controlled by one man and paid in one sum.

In the association which we are now considering such a composite fee is determined by the business manager, perhaps with the advice of the referring physician. Specialists to whom clinic cases are referred are elected by stockholders after having been nominated by the trustees. Since

the reputation of the organization is at stake, great care must be exercised in the naming of these specialists. The trustees must be sure that their training and experience has been of the best. Higher specialization is encouraged and made possible. Thus a member may practice general surgery outside the clinic, but be designated a specialist in brain surgery within the clinic. Is it inconceivable that he may soon develop such a reputation as a brain surgeon that he can confine his work to this higher specialty, a consummation never to have been achieved except through such an organization's support?

Let us now recapitulate the advantage of coöperative or community practice as compared with group practice.

1. The former does not exclude the general practitioner, but offers him the same clinical facilities enjoyed by the specialist, who needs no greater advantage than that afforded by his more intensive knowledge.

The community association may be joined without fear of compromising affiliations because the individual loses none of his freedom of action, none of his personal prestige with the public, none of his financial independence.

3. In the community association, the specialist is not required to "pool" his knowledge and his skill or any part of his income with that of other specialists.

4. Yet the organization provides an adequate mechanism for pooling the knowledge and skill and all of the facilities of its members in selected cases. And a single fee to cover this combined service may be collected by the business department and equitably pro-rated among those participating.

5. When the need of a combined service has been met, the patient returns to his original physician for treatment and management and the organization has no further concern in the case.

6. All clinical facilities are the property of the members and may be used by them subject only to the rules and regulations of the association.

More concisely, the purposes of the association may be defined as follows:

(1) To establish, maintain and operate clinical, pathological, medical, surgical, research and other laboratories and facilities, as well as hospitals, necessary or desirable for the diagnosis and treatment of disease.

(2) To create a coöperative organization of duly qualified and experienced physicians and surgeons representing as near as may be the various branches and requirements of medicine, surgery, and disease prevention, with a view to the greatest convenience, facility, and certainty in

the diagnosis and correct treatment of disease, and of securing the advantage, when needful, of the combined judgment, skill and attention of the associated members, through which each shareholder hereunder may more effectively conduct his practice of medicine or surgery, and under which each will secure the maximum advantages of "group medicine" without the loss of individuality in the practice of his profession.

(3) To facilitate research, instruction, and specialized work in all branches of medicine and surgery.

(4) To furnish accounting, credit, and other business facilities for the shareholders hereunder.

(5) To develop the science of medicine and to advance the best interests and promote the welfare of the profession, and particularly of the shareholders hereunder.

A clinical association designed to promote the interests, not merely of a few men, but of all of those within reach of its influence, must be founded upon mutual confidence and actuated by a spirit of coöperation. It must be constantly borne in mind that the success of any ethical member of the profession redounds to the credit of all. The time-honored principle that the physician's greatest asset is a well satisfied patient may well be applied to coöperative community practice. If the public learns, through experience, that in a given community the physicians and surgeons are all working together with a single purpose, that community will inevitably become a great clinical center.

*—Read at mid-summer meeting of the Radiological Society of North America. Boston, June 3, 1921.

X-Ray and Radium Technique in the Treatment of Lesions Involving Skin and Mucous Membranes

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MY experience in the use of radium and the x-rays covers the relatively short period of five years. During the first two and one-half years my treatment work was done almost exclusively with radium, while I used the x-ray almost solely for diagnostic purposes. The explanation of this is that I had been led to believe that radium was infinitely better than the x-ray as a therapeutic agent in the treatment of malignant and allied conditions; and, secondly, I was unduly apprehensive of the danger of the x-ray. I say this with all due regard for the potency of the modern Coolidge tube, and a full realization for harm when used injudiciously.

The results obtained with radium were, on the whole, satisfactory, and, of course, improved with experience. However, as the volume of my work increased I found it rather difficult to give each individual case the necessary time, especially as a large number of my patients came from out of town without previous appointment, thus making it necessary to dispense with the treatment as rapidly as is consistent with thorough work. Also, the personal equation has much to do with the successful use of either x-ray or radium; and my experience has been that it is almost impossible to get an assistant to whom one may feel satisfied to turn over unreservedly all the details of treatment. In fact, it takes years of experience and a capacity for details, in addition to an aptitude for the work to develop into a first class radiotherapeutist.

For these, and many other reasons, I found it necessary to either get a larger quantity of radium, so that I might treat several patients at one time, or else use some auxiliary treatment in conjunction with the radium that I had. Furthermore, I had, in the meantime, conceived the idea that possibly the varying results obtained by the separate use of the two agents, radium and x-ray, were due mainly to variations of technique. That, the disastrous results obtained with the early use of the x-ray had made us over cautious, and, consequently, we were not giving sufficient dosage. Also, I could see no reason why both agents, if need be, could not be used over the same area when treating lesions in which the skin and mucous membrane were already involved; and that too high voltage, too much filtration, and in-

sufficient length of exposure were being used in the treatment of lesions involving the cutaneous or mucous surfaces. The voltage factor is varied, of course, according to the relative depth of the lesion. The benefit that is derived from radiation, whether radium of x-ray, is due to the rays that are obstructed by the tissues and absorbed therein, rather than to the rays that pass beyond the affected area.

Consequently, I began very cautiously using the x-ray in conjunction with radium in the treatment of surface lesions. During the first year I depended largely upon radium, as I was more familiar with its effects. However, I gradually increased the x-ray dosage and decreased the radium dosage, until, at present, I am giving what I once considered huge doses of x-ray along with a relatively small dose of radium. It is now only about one year since I worked up to the point of such large x-ray dosage along with the smaller radium dosage, and is, of course, too early to arrive at incontrovertible conclusions. Besides, there are several points that are at least debatable, some of which I will mention briefly.

In the first place the beta rays from radium have a greater inhibatory effect upon malignant tissue than either the gamma rays from radium or the x-rays, and, for this reason, I have gone on record as favoring radium in the class of work under discussion. However, after further observation and thought, I am not so certain that my earlier impression is entirely correct. For, it is also true that the gamma rays from radium, and the x-rays have a very definite and pronounced destructive effect upon malignant tissue. Also, because of the abundance of the x-rays and their more homogeneous penetration, it is possible to obtain a more uniform irradiation at a given depth below the surface. Furthermore, the results obtained at my hands by the combined use of the two agents have certainly been as satisfactory as when I used radium alone. So, taking it all in all, the relative merits of the two agents in certain accessible lesions are, in my mind, still debatable, and the last word has not yet been said. This does not imply that either agent can, or will supplant the other, for the man who has radium at his command, in addition to a modern x-ray plant, can do infinitely better work than one who has no such advantage. This is especially true in treating lesions about the eye, nose, mouth, vagina, etc. Also, in the treatment of lesions in which it is desirable to bury radium beneath the surface.

In order to give an idea of the technique referred to in this brief paper, I should like to relate a few short case histories.

Case Reports

Mr. H. Age 50. Epithelioma of the right inner canthus involving almost the entire lower lid, including the mucous membrane. This would be considered a difficult case to treat. Adequate protection was given the eye by using a curved spoon-shaped applicator, covered with rubber. Treatment was given as follows: January 13, 1920. As filter, one thickness of flank-leather was used with 45kv., 10 ma., 5 min., or 50 ma. min. Also one mm. aluminum filter was used with 60 kv., 10 ma., 10 min., or 100 ma. min., making a total of 150 ma. min. On January 13, 1920, a treatment with 50 mg. of radium element for two hours was given. The patient returned February 16, 1920, at which time he was greatly improved. The above treatment was repeated. He returned again March 30 entirely well and with a cosmetic result that was perfect.

Mr. P. Age 64. Epithelioma on the left temple region about the size of a 50-cent piece. He had been treated about one year with fractional doses of x-rays without results. May 22, 1920, the following treatment was given: A filter of one thickness flank leather was used with 40 kv., 10 ma., 15 min., or 150 ma. min. Also a filter of one mm. of aluminum was used with 60 kv., 10 ma., 15 min., or 150 ma. min., making a total of 300 ma. min. On May 23, 1920, 100 mg. radium element (four 25 mg tubes) was applied for one hour. He thus had a total of 300 ma. min. of x-rays and 100 mg. hours of radium. He returned on July 2, 1920, at which time the lesion was entirely healed.

Mr. M. Age 74. Epithelioma on the right cheek about one inch in diameter. This growth was an indurated affair, extending more than one fourth inch above the level of the surrounding tissues, and apparently of an intractable nature. On May 29, 1920, treatment was given as follows: One thickness flank leather filter was used with 50 kv., 10 ma., 30 min., or 300 ma min. Radium element was applied for two hours. On July 7 he returned for further treatment. At this time the growth had almost entirely disappeared, and there was no open wound such as one might expect following such intensive treatment. The following treatment was given: A one mm. aluminum filter was used with 55 kv., 10 ma., 30 min., or 300 ma. min. One hundred mg. of radium element at one-fourth inch distance was used for one hour. On August 24, 1920, the tumor was entirely gone.

Mrs. S. Age 62. Epithelioma on the right cheek about ¾ inch by 1½ inch. She was treated as follows on June 22, 1920: One thickness of thin leather filter was used with 45 kv., 10 ma., 10 min., or 100 ma. min. A one mm. aluminum filter was used with 50 kv. 10 ma., 10 min., or 100 ma. min. A two mm. aluminum filter was used with 60 kv., 10 ma., 10 min., or 100 ma. min., making a total of 300 ma. min. One hundred mg. of radium element was applied for one hour. It was practically well on August 3, 1920, when she returned for inspection.

Mr. D. Age 91. Epithelioma, about three inches in diameter, involving the entire right ear and adjacent tissues, apparently an entirely hopeless proposition. On July 1, 1920, treatment was given as follows: No filter was used with 45 kv., 10 ma., 10 min., or 100 ma. min. A one thickness flank leather was used with 50 kv., 10 ma., 10 min., or 100 ma. min. A one mm. aluminum filter was used with 60 kv., 10 ma., 20 min., or 200 ma. min., making a total of 400 ma. min. In addition, he was treated with 150 mg. of radium element, at a distance of one inch for thirty hours, making a total of 4,500 mg. hours radium element. On August 7, 1920, he returned entirely well, except for one small spot just within the concha of the ear.

Mr. D. Age 55. Epithelioma, about one inch in diameter, of rapid growth, on the dorsal aspect of the left hand. On July 10, 1920, treatment was given as follows: A one thickness flank leather filter was used with 40 kv., 10 ma., 30 min., or 300 ma. min. One hundred mg. of radium element was applied for one hour. On September 9, 1920, he was entirely well.

Mr. S. Age 63. Epithelioma, about one inch in diameter, under the right eye. This was a rather deep indurated growth. On July 21, 1920, treatment was given as follows: A one thickness flank leather filter was used with 35 kv., 10 ma., 10 min., or 100 ma. min. A one mm. aluminum filter was used with 45 kv., 10 ma., 20 min., or 200 ma. min., making a total of 300 ma. min. One hundred mg. of radium element was used for three hours. The patient returned on September 10, 1920, for inspection and was found entirely well.

Mrs. H. Age 48. Epithelioma involving the right upper lip. On July 24, 1920, treatment was given as follows: O one thickness flank leather was used with 45 kv., 10 ma., 20 min., or 200 ma. min. A one mm. aluminum filter was used with 50 kv., 10 ma., 20 min., or 200 ma. min., making a total of 400 ma. min. One hundred mg. of radium was applied for one hour. On September 12, 1920, the patient was entirely well.

In all these cases, a skin-target distance of approximately seven inches was used.

From the above reports the following facts are evident.

1. That the x-ray dosage is much larger than that generally used.

2. That the radium dosage alone is entirely too small to produce definite results.

3. Whether or not the short radium exposure aided materially is not known.

4. That the results are satisfactory, and were obtained quickly, with a minimum amount of time consumption to both operator and patient.

5. That no attempt has been made to standardize the technique with respect to the bearing that voltage, milliamperage, filtration, and length of exposure have upon the lethal dose.

6. That nothing has been brought forth to determine the superiority of either agent in lesions that are accessible to both.

The cases reported are typical of scores of others that I have treated within the past year, and I am quite positive that I am getting just as good, if not better, results by the combined method of treatment as when I used radium alone. Also, in no case has there been any untoward result from treatment, and the healing process has been unusually rapid. I hope within the next few months to arrive at more accurate conclusions with reference to standardization of technique in the treatment of surface lesions.

I have made no attempt to discuss the necessity of raying the contiguous glands, for this is a matter with which all of you are familiar. So far as the surface is concerned, we are here dealing with normal skin and an erythema dose, and not with diseased skin and a lethal dose.

In conclusion, I should like to mention the value of thermocoagulation as a preliminary measure in the treatment of surface lesions, in which it is advisable to remove more or less tissue before using x-ray or radium, and to bring to your attention the multiple needle method that I improvised for my own use. The greatest trouble that I have encountered in using thermocoagulation has been the pain incident to the operation as it is usually done. By anesthetizing the part, and using two sets of connected needles for the two poles, the operation is made both painless and bloodless. It is thus possible to remove any amount of tissue desired, and, in my opinion, is the best method at our command.

X-Ray Diagnosis of Osteomyelitis

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X-RAY diagnosis of osteomyelitis is not amenable during the active stage, as it can only be made when the disease has become more or less chronic, in fact, there are usually no definite radiographic findings during the first ten days.

In reviewing the anatomy of bone, we recall that it consists of a marrow cavity, containing the medullary fat, the blood and lymph vessels as well as the nerves. Then we have the cortex, or the dense hard bone surrounding the marrow cavity, which in turn is covered by a strong fibrous sheath, called periosteum. When an inflammatory process involves the marrow, it is called a myelitis, whereas, if the cortex only is involved, we term it osteitis, and when the same applies to the periosteum it is called a periostitis, but when they are all involved simultaneously, it is an osteomyelitis.

The nature of the organism causing the disease may vary, but the end result is always the same, provided the infection is of sufficient severity and duration.

The portals of infectious entry in osteomyelitis are recognized as hematogenous, lymphoid and direct. The two former may arise in the shaft beneath the periosteum, or in a joint space, while the latter or direct, is carried in from the outside, as seen in penetrating wounds and compound fractures.

The hematogenous and lymphoid type, as seen in myelitis, attacks the medullary canal by way of the nutrient vessels, the infection traveling rapidly up and down through the soft structure and is usually limited within the bone, with no involvement of the cortex and periosteum.

In periostitis and osteitis the infection becomes lodged beneath the periosteum. It is more or less limited in action and has a lesser tendency to spread. When the infection originates within a joint space, there usually results an extensive destruction of the articulation surfaces, which may permeate the same and proceed to destroy the cancellous area in the head of the bone, but usually has a slow tendency to proceed throughout the medullary cavity.

In compound fractures and in penetrating gun shot wounds, the infection is carried directly to the medullary canal, as well as to the loose, exposed, bony fragments present, so that all the bone structure becomes involved.

The bone changes which occur in osteomyelitis are destructive as well as reproductive, at one and the same time; and x-ray diagnosis is made by the variation present in these two processes, remembering that bone reproduction does not take place before nature is getting a mastery of the situation and that destruction is present both during the acute and chronic stages.

Normal bone is pierced by numerous so-called Haversian canals, which are in direct communication with the marrow cavity, and you can readily understand how a medullary infection can and will enter these canals. When this takes place we soon find evidence of bone destruction along these same Haversian canals, which, finally by their tortuous ramifications, will eventually surround completely a portion of normal bone, and thus devitalize it and produce the formation of a sequestrum.

The cortex may also be pierced at one or more places, leaving areas of normal bone between and the rapidity of this change, together with the formation of sequestrae, is, of course, dependent on the virulence of the infection. This is an important factor to remember in the differential diagnosis of malignancy, as in the latter, when of the destructive type, never do we find intermingling areas of normal bone and neither does the cortex destroy in part, but instead completely, as a whole.

Remember, that as long as there is no destructive bone process present the radiograph must of necessity be negative, although an active, acute and virulent osteomyelitic infection may exist, and one must always take stock of the clinical history and symptoms before making a final radiographic interpretation.

Chronic osteomyelitis manifests itself by a beginning bone reproduction at the edge of the infection, due to the irritation or the stimulation at this point, which means that new bone will follow the edge of the infection as well as deposit on bone shafts, sufficiently so as to give an appearance of bone expansion, which, however, under close inspection, reveals itself as an external bone deposit.

Sometimes the medullary cavity becomes obliterated through this same process, or a bone shaft becomes thickened and irregular in contour with areas of increased and decreased density throughout.

To recapitulate, the following statement holds true, that in acute osteomyelitis there is bone destruction with but little bone reproduction, whereas, in chronic cases the reverse is present.

You will thus understand that the x-ray plate in osteomyelitis is not a definite one, as it may show shadows representing one

or more of the following changes such as increased or decreased density, areas of destruction or bone necrosis, areas of bone reproduction, enlargement of bone with irregularity in outline, and the presence of sequestra and involucrum.

The forms of osteomyelitis thus far considered, represent the pyogenic infections; and before closing I will mention briefly a constitutional bone infection. which is quite frequently seen, namely syphilis.

This usually manifests itself by being existent in multiple bones, and the clinical symptoms are rather mild, when compared to the apparent pronounced pathology shown on the x-ray plate. If the luetic infection is periosteal, as so frequently seen on the tibia, the bone deposit is parallel to the shaft along the anterior border, producing the so-called saber deformity. In the acute stages the periostitis shows as multiple distinct laminae laid down upon the old cortex, and has a lacy appearance, whereas, the chronic form has the dense condition as above stated.

In conclusion, I wish to state that the x-ray study of osteomyelitis should always be associated with the patient's clinical history, to better aid the roentgenologist in a true interpretation of the various densities which a radiograph may present.

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Pathology and Etiology of Cancer

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Introduction

THIS paper is based largely upon material received at the Pathological Laboratory of the State Institute for the study of Malignant Disease, Buffalo, N. Y., and is written for the surgeon, from the standpoint of the pathologist.

The Buffalo Institute was the first of its kind to be established in the world for the exclusive study of malignant disease, the primary object being research of cancer and allied diseases, and as far as I am aware, the only institution for exclusive medical research supported by a state.

The Institute also offers to the surgeons of the state, a free diagnostic service of pathological tissues. Since this service was instituted, we have received over 20,000 specimens. At present we are receiving from forty to fifty daily.

By the use of the freezing microtome we are enabled to return a diagnosis the same day the specimen is received, and if requested, we gladly send a telegraphic report, which means that in the majority of cases, the surgeon in any part of the state can receive his report by this means within twelve hours of sending the specimen.

The title of this paper, "Pathology and Etiology of Cancer," covers an extremely large subject, inasmuch as we have come to consider that cancer is not a single disease, but a great group of diseases which have certain characteristics in common. For example, we may cite malignant disease in the uterus. Cervical malignancy differs distinctly from corpus malignancy in regard to etiology, anatomical structure and clinical course, and are as different as measles is from scarlet fever.

In the time allotted we can only touch briefly on the most salient points.

By the word cancer, we commonly understand the epithelial malignant neoplasms. These make up ninety per cent of malignant disease, but many also include in this term, the connective tissue group of malignant tumors, the sarcomata, which nearly constitute the remaining ten per cent.

Cancer is essentially an unlimited, disorderly proliferation of cells. The best known factor in instituting this unlimited growth is chronic insult or injury. It would also seem from clinical observation and experimental evidence, especially in relation to the hereditary tendency

to malignant disease in the breast of mice, that an inherited instability of certain groups of cells is also a potent factor in the development of this disease.

Probably every cell in the body has potentially the power of reproduction, but the more highly developed or specialized a cell becomes, just so in proportion does it lose its power of growth. I like to think of the cells in which a malignant neoplasm originates, as being unstable cells, in which continued insult causes them to revert to the growing type.

The cells from which cancer may spring may be either (1) misplaced embryonic calls or teratoid growths; (2) benign tumor cells; (3) previously normal cells.

Of the tumors springing from previously normal cells, and these constitute the great majority, we may distinguish two types; first, those highly specialized cells which make up the glandular tissues of the body, and second, the normally growing cells, as those that constitute the epithelium of the skin and non-glandular mucous membranes. It is easier to conceive that the latter type of cells which are normally growing cells, might be made to grow atypically with less stimulus than the highly specialized cells.

Etiology

Considering that cancer is not a single disease, but a group of diseases, it is not, therefore, possible to have a single etiological cause for the entire group. The most definite outstanding factors in the causation of malignant disease may be grouped under four heads, namely:

(1) Infectious.
(2) Mechanical Injury.
(3) Thermic Conditions.
(4) Chemical Influences.

It is often stated that we do not know the cause of cancer. If we mean by this that we do not know the exact biological mechanism by which certain influences stimulate a cell to take on excessive unlimited growth, the statement is quite true. Neither do we know the exact mechanism by which the toxin of a specific organism kills a cell, as in the case of the toxin of the tubercle bacillus in tuberculosis. The trouble in cancer is that there are many and varied influences which can stimulate a susceptible cell or group of cells to abnormal proliferation, and that any one of these various influences may cause the biological change in the same type of cell in the same organ at different times. Therefore, we must accept that there is not always a single specific cause for malignant growth comparable to that which we find in the infectious diseases of known etiology. We know that in some cases the onset of the malignancy may be brought about by the continued

action of heat, or by certain chemical substances, by toxins and metabolic products of organisms, and also probably by purely mechanical injury as caused by contracture of scar tissue.

I wish to make plain that different types of malignancy have different causes, that the same type of cell may be made to grow atypically by different influences acting upon it, and that we can never hope to find a single specific cause for the entire group of malignant neoplasms.

In human pathology we have no outspoken evidence of a specific organism as the causative factor, but in experimental pathology we have malignant lesions which may be considered in this light; first, the chicken sarcoma of Peyton Rous, which histologically is a spindle cell sarcoma, and which may be reproduced indefinitely by the injection of a cell free filtrate, which evidently contains an ultra-microscopic organism, and which attacks the cells of the host, producing a neoplasm.

A less definite type is carcinoma of the stomach in rats, produced experimentally by Fibiger of Copenhagen, by feeding these rats with cockroaches which have in their tissues the embryonic form of a nematode worm. This worm burrows in the mucosa of the stomach, and in a certain number of the infected rats, there is produced true tumor formation of a papillar type, some of which give a typical histological picture of carcinoma and show infiltration with the production of metastases.

A similar condition is found in human beings, in which a nematode worm, the Distoma Hematobium in Bilharzia's Disease, deposits its eggs in the mucosa of the bladder, causing in certain of these cases a malignant neoplasm.

Carcinoma of the thyroid in fish, contagious lympho-sarcoma in dogs, and the infectious epithelioma of cattle, are types found in nature in the lower animals, where organisms or infectious agents seem responsible for the new growths.

Much more apparent is the effect of mechanical injury. The great majority of epitheliomata of the lip is associated with pipe or cigar smoking, while malignant disease of the tongue is associated constantly with ragged teeth. I might mention that fifty per cent of our tongue cases give a positive Wasserman reaction, thus showing association with syphilis, which suggests the influence of the toxin of an organism in relation with mechanical injury.

Carcinoma of the liver and pancreas is intimately connected with cirrhosis of these organs.

Cancer of the gall-bladder shows a remarkable relation to cholelithiasis, gall stones being present in ninety per cent of the

cases, and probably five to ten per cent of cholelithiasis is followed by malignant disease.

Epithelioma of the scrotum in chimney-sweeps and carcinoma of the lung in stone-cutters are other well known examples. The site of predilection of malignant disease in the stomach and intestines is closely related to points of fixation and mechanical injury.

As examples of the thermic influence in the causation of malignant disease, we have notably the epithelioma of the skin of the abdomen in those natives of Kashmir who wear the kangri-stove. Epithelioma caused by continued exposure to x-ray or following x-ray dermatitis, and the well known occurrence of epithelioma in scars from burns are also familiar examples.

Chemical influence is shown by the frequency of cancer of the bladder in anilin workers, epithelioma of the skin in paraffin workers, and experimentally, epithelioma has been produced in animals by long continued injection of coal tar.

No doubt insult and injury so subtle as not to be recognized grossly, is often offered to cells, which may alter their biological characteristics and institute that process which we recognize as malignant disease.

In dealing with the etiology of cancer there are certain conditions so often associated with this disease that they have been termed "precancerous lesions." These might be classified into three groups, namely:

First, those potentially malignant, as in Paget's Disease, and papilloma of the urinary bladder. These lesions if allowed to continue will probably always produce carcinoma.

Second, those conditions which frequently undergo malignant change, examples of which are papillar serous cysts of the ovary, over half of which undergo malignancy, papilloma of the larynx, and especially chronic cystic mastitis, thirty per cent of which is followed by cancer of the breast. Unhealed leukoplakia undergoes malignant change in twenty-five per cent of all cases, while ten per cent of hydatid mole is followed by chorion epithelioma.

Third, those lesions which are occasionally followed by malignancy. This class would include the congenital papillar naevus, benign adenomata of the thyroid and breast, adenomatous polyps of the intestine and other similar benign lesions.[1] No doubt in all of these cases chronic insult and injury plays an important part in instigating the malignant change.

Age

The importance of age in the etiology of malignant disease has been given too much significance, especially in regard to its relation to carcinoma. While no doubt the majority of epithelial cancer occurs past forty, one ought never

to forget the fact that this type of malignant disease may occur at any age. We have amongst our statistics many cases of carcinoma in the twenties and even earlier. Whether it be that cancer is occurring earlier in life than formerly, or whether we are seeing more, the fact remains that cancer of the stomach, cervix, intestines and also other organs of the body, is being frequently met with in the early decades of life. An important factor in regard to age is the observation that the earlier cancer occurs in an individual the more malignant it apparently is.

Sex

The influence of sex is largely due to anatomical structure and environment in the great majority of cases, although it is said that in regions where pipe-smoking is as common with women as with men that epithelioma of the lip does not begin to occur as frequently in the female as in the male. On the other hand, among certain of the natives of India, where both sexes chew the betel-nut, malignant disease of the mouth and tongue is as frequent in the female as in the male.

An interesting point in regard to environment and customs, is the fact that carcinoma of the breast is second in frequency of all cancer in the women of England, occurring in eighteen per one hundred thousand, while in Japan it occurs next to the last in frequency, being but 1.8 per one hundred thousand. The only marked point of difference in custom in regard to this condition, would be the fact that the English women wear corsets, while the Japanese women do not.

Classification

Often considerable confusion exists in the nomenclature of malignant disease, due to the classification in some cases being from a histological viewpoint, and in other cases from the clinical.

We will first consider a classification based upon the histological findings and then a classification according to the clinical types and try to correlate these types. We have endeavored to make this classification as simple as possible.

Histologically, epithelial new growths may be classified under three main divisions:

(1) Epithelioma.

(2) Adeno-carcinoma.

(3) Medullary or solid carcinoma.

The epitheliomata, which take their origin either from the epithelium of the skin or non-glandular mucous membranes, are distinctive from the glandular epithelial neoplasms. They may be conveniently divided into three groups:

(1) Pearl or prickle cell epithelioma springing from the skin.

(2) Basal cell epithelioma springing from the epithelium of the hair follicles, or glands of the skin.

(3) Mucous membrane epithelioma, which arises from the mucous membranes covered with stratified squamous epithelium, as in the cervix, mouth, vagina, oesophagus, etc.

The adeno-carcinoma is a histological type springing from glandular structures, and characterized by the cells, aping, more or less, the structure of the glands from which they spring. These include usually duct and papillar adeno-carcinoma.

The term medullary carcinoma has been given to those tumors which histologically show solid masses of growing epithelial cells, which do not tend to differentiate themselves in gland-like structure.

But at times in medullary carcinoma groups of cells appear to arrange themselves in such a manner as to form small central lumina, thus showing some tendency toward polarity, and this structure has led to the use of such terms as alveolar, acinar or tubular carcinoma. As a general rule, the nearer a cancer cell tends to differentiate itself toward the normal form, the less malignant it probably is.

Thus is may be accepted, that tumor cells which tend to imitate the normal structure are probably more slowly growing cells, and tumors of this type are thus less malignant. The medullary or solid type of cancer being composed of more immature cells represents the more malignant type.

Clinical Types

The classification of cancer from the clinical type is based upon the appearance or other gross characteristics of the neoplasm. Consequently we have:

(1) Papillar or fungoid carcinoma, characterized by papillary outgrowth on surfaces.

(2) Infiltrating carcinoma, a tumor growth with a tendency to grow into the surrounding tissues.

(3) Ulcerating carcinoma, which is often but a later stage of the papillar or infiltrating, but may have originated in an ulcer.

(4) Medullary carcinoma, the term applied to the very cellular soft varieties.

(5) Scirrhous carcinoma, a term used where the tumor is extremely hard.

(6) Gelatinous or colloid carcinoma, in which there is a great tendency to the production of mucin, which gives a jelly-like appearance to the cancer.

It is not always possible to correlate the histological and the clinical types, for many of the histological types may appear in any of these clinical forms. Papillar carcinoma, springing from mucous membranes covered by stratified squamous epithelium are most always mucous membrane epitheliomata, while those springing from glandular mucous membranes are usually adeno-carcinoma.

The infiltrating type is usually medullary or solid carcinoma.

Scirrhous cancers are characterized by an excessive amount of connective tissue stroma.

In epithelial neoplasms the stroma is merely a part of the framework and does not partake of the malignancy. It is formed by proliferation of connective tissue cells and these cells have a definite rate of growth. When the cancer cells grow rapidly, they outstrip the connective tissue, and we have a soft cellular or medullary carcinoma. When the cancer cells grow slowly, the connective tissue elements outstrip the cancer cells, and in this case we have a preponderance of stroma and thus a scirrhous carcinoma. But the condition is evidently local, for it is quite the rule that scirrhous cancer metastasizes nearly as frequently as medullary carcinoma, and very often, the metastatic growths do not show the scirrhous type, but are bulky cellular growths.

The gelatinous type, frequently called colloid carcinoma, is characterized by a production of mucin or a degeneration of the tumor cells into a mucinous substance, and histologically is adeno- carcinoma.

The significance of these various clinical types may briefly be summarized as follows:

The papillar or fungoid growths are usually comparatively benign. They are characterized by late metastasis and it is this type of malignant tumors in which we may expect the happiest results from surgical procedure.

On the other hand the infiltrating, ulcerating and medullary types are characterized by infiltration in the surrounding tissue with early metastasis.

Scirrhous carcinoma, as mentioned above, is usually characterized by slow growth and is the type usually seen in older people.

Gelatinous carcinoma has little tendency to metastasis, but has marked invasive characteristics, penetrating into the muscular walls, and in the case of the intestines and gall-bladder, where it is most commonly found, it becomes extensively disseminated throughout the peritoneal cavity.

The different types of epithelioma have their distinct clinical differences, which may be briefly stated as follows: the basal cell epithelioma occurs most frequently in the later decades of life, and is almost exclusively confined to the regions above a line corresponding to the angles of the mouth. Metastases are extremely rare.

The prickle or pearl cell epithelioma usually occurs earlier in life than the basal cell. While the great majority occur at the orfices, as the lip, vulva, and anus, and on the penis, it may originate anywhere in the skin.

Metastases occur often, but comparatively late.

The mucous membrane epithelioma springs from mucous membranes covered with stratified squamous epithelium, and is characterized by its early occurrance in younger people, and by its marked tendency to early and extensive metastases.

Metastasis

As is well known, metastasis, in epithelial malignant growths, is usually through the lymph-channels into the regional lymph-nodes, and is accounted for by the facility by which epithelial cells grow into lymph spaces.

Occasionally tumor cells penetrate the vessel walls and metastasis in this case, occurs by the blood stream, often producing distant metastasis and carcinomatosis.

Apparently there are some biological phenomena associated with metastases, for the size of the primary tumor, or the duration of the disease, does not always determine their presence. Very small, apparently early tumors of the breast, frequently show extensive metastases in the axilla, while on the other hand, large tumors of relatively long standing, show only hyperplasia of the lymphnodes, but no infiltration with malignant cells.

In experimental cancer we have found that in definite strains of transplanted breast tumors of mice, metastases occur when there is some evidence of a loss of immunity in the animals. This is evidenced by the appearance of sudden rapid growth in the tumor mass, after a period of moderate growth, and is quite constant for strain. An interesting point in this connection is the fact that we can artificially produce, prematurely, metastases in these animals, by rough handling or massage of the tumors, a significant point to have in mind when palpating suspicious lesions.

The presence of metastases is of grave prognostic import, for in the majority of cases of malignant disease, the chances for cure after the primary tumor has metastasized are greatly reduced.

*—Read at meeting of American College of Surgeons, Nebraska Section, Omaha, March 3, 1921.

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Oral Radiography

IT is probable no other particular branch of radiology warrants more earnest consideration and conscientious study, at this juncture in the development of the science, than oral radiography. Radiology is surging rapidly to the fore, but that it may not later fall because of its own shortcomings, a supreme effort should be made to round out its structural foundation.

This is a far-reaching statement, and it is made with full cognizance of the vast possibilities radiology has already opened up for extended certainty of service in the scientific discovery and treatment of disease.

But from the fact that it has in so short a time accomplished so much arises an enormous obligation to avoid the treacherous consequences of acts of omission as well as commission. The fact is oral radiography has been sadly neglected. No other branch of this specialty has furnished so rich opportunity and at one and the same time has been so grossly and wantonly abused.

Two things appear with alarming clarity: one, that medical radiologists know comparatively little about the pathology of the mouth; and two, mighty few dentists know enough about the technique of radiology to function properly.

There is an old adage to the effect that the pot should not call the kettle black. Mindful of the wisdom of that saw, crimination and recrimination will neither be indulged nor tolerated. Whatever is said on the subject from either the medical or the dental side will be absolutely free from that contemptuous form of professional suicide. There shall probably be points of difference. But there is no harm in disagreement—rather progress most often springs from the bowels of disagreement. And even in disagreement man may evince those little refinements and little elegancies which have since time immemorial been recognized as the mark of gentlemen.

In the first place, two matters of vital importance must be worked out if the radiologists on the medical side are to fulfil their functions, and if the dentists on their side are to advance in the practice of their science commensurately with public demand. Those two things are: One, uniformity of nomenclature; and two, standardized technique based on a thorough understanding of mouth pathology. At present, there is such a multiplicity of terms describing identical oral conditions, and such a paucity of knowledge concerning the technique of oral radiology, that both dentist and medical diagnostician experience keen disappointment in the results obtained.

There is also so much mediocrity in product that oftentimes interpretations are made from intra-oral radiograms which are not in any measure interpretable either because of over or under-exposure, distortion, or lack of detail. There is, too, a deplorable tendency to make dental radiograms with too great a degree of penetration, which results in burning up the

delicate bone detail so essential in diagnosing a dental case. In such cases, areas of residual infection in the sites of old extractions go undetected and only gross lesions are observed.

These are only a few of the avenues of approach to the bigger problem of the relation of oral foci to systemic disease, a problem worthy the best combined efforts of the dental and medical professions. With this as the ultimate goal, The Journal will from time to time, beginning with this issue, print articles written by reputable dentists on the various aspects of oral radiography. They will be written by such men as Dr. Frederic F. Molt of Chicago, Dr. Clarence O. Simpson of St. Louis, Dr. William L. Shearer of Omaha, and Dr. Howard R. Raper of Albuquerque, New Mexico.

Without being guilty of presumption, in view of what has been said, The Journal feels that it may rightfully bespeak the sincere and intelligent coöperation of dentists and radiologists everywhere in the direction indicated.

Chicago Roentgen Society

OFFICERS of the Chicago Roentgen Society for the ensuing year are: President, Dr. B. H. Orndorff; Vice President, Dr. B. C. Cushway; Secretary, Dr. E. S. Blaine.

Canadians License Technicians

AT THE recent meeting of the Canadian Radiological Society which was held at Niagara Falls, Ontario, a resolution of considerable importance was passed. This resolution had to do with relationship of the Canadian radiologist to the technician. In so far as possible they are attempting to follow the British plan of licensing technicians. The scheme of the Canadian Society is to have a licensing board appointed by the society to which any technician may make application for license. They must then pass an examination and in addition to the examination must show two years actual experience under a competent medical radiologist. After the examination has been passed the technician receives a license issued by the license board of the Canadian Radiological Society. This license is active only so long as the technician is associated with the radiologist. If he should sever his relationship with the medical radiologist and attempt to establish a lay laboratory, his license would immediately become invalid.

Resolutions Adopted by The Radiological Society of North America at Annual Meeting, Chicago, December, 1920.

WHEREAS, the question of the ownership of the roentgenogram has never been definitely settled, and

WHEREAS, other points regarding the ethics and conduct of radiologists relative to the disposal of their roentgenograms, records and reports of their findings, have never been clearly outlined; therefore, be it

RESOLVED, by The Radiological Society of North America, that it is the sense and judgment of this society, that all roentgenograms, plates, films, negatives, photographs, tracings or other records of examinations are hereby declared to be the exclusive property of the radiologist who made them (or the laboratory where they were made); and be it further

RESOLVED, that the ethics of this society shall be in full harmony with the "Principles of Medical Ethics of the American Medical Association, with the following additions, to-wit:

The radiologist is hereby declared to be a consultant in all cases where he is called upon to examine patients.

The radiologist shall not make known to patients, their relatives, friends or guardians, any of his findings or conclusions, nor shall he deliver to them any of the plates, negatives, films or prints, unless expressly requested to do so by the physician or surgeon who referred the patient for examination, or is in charge of the case.

It shall be considered unethical to advertise by circularizing in the medical or lay press with price lists or fee tables, descriptions or illustrations of office apparatus or facilities, or to advertise by displaying signs stating the medical specialty; or in the public press, telephone directories, or city, state or national directories, which are published for general use.

It shall be considered unethical for any one to claim superiority in diagnosis or treatment, due to some secret process, method or apparatus held to be known only by the claimant.

American Roentgen Ray Society Meeting

THE annual meeting of the American Roentgen Ray Society will be held at Washington, D C., on September 27th, 28th, 29th and 30th. President Arthur C. Christie calls attention to the fact that the meeting will be arranged this year so that approximately two days time will be given over to the discussion of therapy and two days to the discussion of diagnostic problems. The program is now complete and is made up of men of the highest rank in our own country, as well as from foreign countries. Dr. Ledoux-Lebard of France will deliver the Caldwell lecture.

It is extremely important that all who expect to attend make hotel reservation at once. Headquarters will be at the Hotel Washington. Hotel accommodations for members and guests may be arranged at the Washington Hotel and The New Ebbitt Hotel. Requests for reservations should be addressed to these hotels, stating that accommodations are desired for the meeting of the American Roentgen Ray Society. This will assure reservation.

State Medicine

DEPENDING on the measure of importance which they attach to the science of medicine as a preventive agent or curative factor, the individual members of the medical profession may, or may not, find solace in the findings of the Committee of the American Engineering Council that the annual industrial or economic loss in the United States from "preventive disease and death exceeds $3,000,000,000.

Depending also on their willingness to meet the issue squarely in an effort to discover that practical plan which will make it possible for the medical profession as a socio-economic unit to fulfill its full purpose, those same members of the profession may, if they will, discern the reason for the economic demand for some form of state medicine in the fact just recited. As they may also find cause for serious thought concerning the future of the profession in the manner in which the committee in question disposed of so important a problem. One of two conclusions is inescapable, that is, that the committee did not desire to assume the responsibility for attempting solution of the problem set up or that it is satisfied with the present agitation looking to state medicine. That is essentially true, because the committee is authority for the statement that 42,000,000 persons lost 350,000,000 days from illness and disease and non-industrial accidents last year.

The importance of this latter fact becomes apparent when it is known

that 42,000,000 persons constitute the entire wage earning population of the United States, including every person earning $5,000 yearly or less.

Stated conversely, the average annual loss to each one of the 42,000,000 persons composing the industrial and commercial fabric of the United States last year was eight and one-half days, from causes which can very largely be removed or controlled by a properly organized and administered system of preventive medicine.

That is a big assumption. But nothing less than its comprehension and reduction to practical accomplishment will save the neck of the medical profession as a scientific complement of the bread and butter existence of the people of this country.

And because this problem is of such magnitude and so vital to the profession, as well as the public, it is not something to be discussed vaguely in the whispering gallery of idealism. It must be met fearlessly with the combined acumen and sagacity of the profession and some arrangement devised that will be capable of understanding by, and in sympathy with, the needs and aspirations of 42,000,000 wage earners and their dependents. The ideals of the medical profession must be expanded from the individualistic type of human service to a national size, and coördinated effort of the entire profession toward the accomplishment of a national purpose, that is, the public health, become the new vision which will impel the individual members of the profession to its achievement.

Undoubtedly some of these thoughts surged in the mind of Dr. Hubert Work, president of the American Medical Association, as he contemplated his presidential message, delivered at Boston last June, for he said:

> "Thoughtful men believe that a crisis threatens established principles, and that physicians must now earnestly address themselves to the cause and prevention of disease and disability as the primary concept of medicine. If its members become piece workers it may fail of public appreciation as an essential economic factor in the preservation of national wealth, because of a depreciating national health."

Dr. Work also emphasizes the need for some inclusive medical program, as evidenced by his statement that:

> "The art and science of medicine is comprehensive and rational. It can never be dogmatized or restricted, for it comprehends a knowledge of every art and science which may contribute to it, for the single purpose of obviating the tendency to death."

He also realized the public demand for preventive functioning by the profession, as disclosed in the following excerpt:

> "The needs of mankind have created and developed the physician, but we now have progressed in the curative art as applied to the relief of a single organ as far as we may safely go without advancing a philosophy of medicine applicable to a nation."

And that Dr. Work is convinced the solution for the present problem which confronts the profession must be based on a practical philosophy of economics is proven by his declaration that:

> "Medicine cannot be dissociated from economics without inviting the deterioration which has come to older civilizations whose histories have been written."

In view of the large picture of opportunity for public service and the responsibilities of the medical profession, drawn by Dr. Work, one may not accept his next assertion without some chagrin.

To quote again:

> "Our scheme of governmental administration provides for a sec-

retary of labor to guard wage rights; a secretary of agriculture to study animal husbandry; a public health service under a lay secretary of the treasury, BUT THERE IS NO ONE CHARGED WITH CONSERVING THE PHYSICAL ABILITY OF MEN TO DO A DAY'S WORK."

With due respect to Dr. Work's position and the well established attitude of the American Medical Association on the question of professional obligation, it is somewhat difficult to harmonize this statement with the balance of his address. It would seem that the concept of the medical profession is, or should be, the conservation "of the physical ability of men to do a day's work."

This is especially true when one remembers that labor has found it necessary to guard its wage rights through organization independently of and as a means for forcing political recognition. When one looks for the motive behind animal husbandry and discovers that in the main the farm vote is a subtle though controlling influence; and when, as Dr. Work admits, one realizes that the public health service is not now a functioning unit of the government. In other words, it has been proven too often to need further demonstration that a governmental agency for constructive effort must be vitalized constantly from without; and that such a unit, under our form of government, almost always proves to be more efficacious as a corrective influence than as a power imbued with the initiative demanded for the successful comprehension of the diverse ramifications of the public health question.

Believing that the burden rests on the medical profession to present some plan which will ultimately accomplish a better condition of public health through intelligent living on the part of the public, and preventive measures established and administered by the profession itself, the prime purpose of this writing is to set up the outlines of a true picture of the national, physical and mental problem; to point out the trend of our physical wellbeing; to help lift the curtain of uncertainty from the future of the medical profession, and to assist in charting a course which will meet the urgent needs of the social body as by substituting conscious purpose for tradition.

In any comprehensive study of the public health question, whether from a preventive or curative standpoint—but more especially the former—it is absolutely essential to determine three facts as the premise on which to rear the superstructure of an intelligent and inclusive plan of procedure. Those three facts are:

1. Distribution of nativity for the purpose of affording comparison of hereditary characteristics and environmental influences.
2. Ratio of defectives according to geographical subdivision and occupational tendencies.
3. Distribution of defectives according to specific disease.

For this reason the surgeon general's report is a very valuable compilation. It gives the results of the first and only comprehensive survey of our physical and mental stamina, and furnishes the information with which the three primary facts can be established. Notwithstanding the fact that the information which the surgeon general's report contains was compiled for purely military purposes, the medical profession enjoys the unprecedented opportunity of using it for social, economic and medical account, as by proceeding from the facts which it discloses to a better understanding of the relation which our polyglot nativity and occupational tendencies bear to the question of public health.

Acting on the assumption that the medical profession will be in entire accord with any sincere effort to arrive at an incontrovertible base from which to proceed in this matter, certain facts have been taken from the surgeon general's report and are set up here for the purpose of giving the profession a true picture of our national health problem. The geographical units established by the War Department have been accepted and used, and the figures which follow are allocated according to the geographical groupings fixed by the War Department in its examination of drafted men under the selective service act. The three facts mentioned as the primary base of a study of this character are shown as to each of the nine geographical groups, which make it a comparatively simple matter for any member of the medical profession to study in detail the conditions of the particular unit in which he is interested, unhampered by the reduction of all the groups to a single national composite unit. By setting the data up in this form, also, it is easy to make comparisons and draw conclusions not otherwise possible.

There is much data for serious consideration by the thoughtful members of the profession in the figures given. It is hoped they will be given the sincere study they merit and that they will afford tangible benefit to those persons seeking honestly to bring the profession to a conception of the social problem it, and it alone, can solve with that degree of advantage which will enhance materially the public welfare.

Population stated in percentages of nativity; ratio of total defectives per 1,000 men, and ratio of five principal defects per 1,000 men.

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GROUP I.—Composed of states of New York, Pennsylvania, New Jersey and Delaware.

Percentage of nativity

Native White	45 %	Negro	1½%
Austrian and Russian	15 %	Canadian	1 %
German	12½%	Scotch	1 %
Irish	12½%	Hungarian	1 %
Italian	5 %	Scandinavian	½%
Other Foreign White	2½%		
Mexican and West Indian	2½%		100 %

Ratio defects per 1,000 men

New York	502.7	Pennsylvania	500.
New Jersey	452.3	Delaware	475.18

Ratio of defectives by disease.

	New York	New Jersey	Pennsylvania	Delaware
Tuberculosis	27.06	22.26	22.08	15.02
Venereal	29.77	34.99	36.48	77.21
Cardio-Vascular	41.05	30.88	32.83	24.82
Developmental	36.20	35.10	32.77	57.76
Nervous and Mental Disorders	14.8	10.87	14.62	9.75

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GROUP II.—Composed of states of Maine, New Hampshire, Vermont, Connecticut, Rhode Island and Massachusetts.

Percentage of nativity

Native White	42½%	German	4 %
Canadians	15 %	Italian	3 %
Irish	15 %	Scotch	2 %
Austrian and Russian	5 %	Scandinavian	2 %
Other Foreign White	5 %	Negro	2 %
English	4½%		100 %

Ratio defects per 1,000 men

Maine	563.61	Vermont	613.19
New Hampshire	505.28	Connecticut	507.89
		Rhode Island	640.48

Ratio of defectives by disease.

	Maine	N. H.	Ver.	Conn.	R. I.
Tuberculosis	31.47	17.36	27.72	27.63	40.18
Venereal	23.74	18.49	13.03	26.55	27.56
Cardio-Vascular	55.70	23.63	46.51	34.20	44.33
Developmental	72.10	59.16	68.33	39.32	112.51
Nervous and Mental Disorders	25.98	13.54	39.35	14.62	19.68

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GROUP III.—Composed of states of Wisconsin, Illinois, Indiana, Ohio and Michigan.

Percentage of nativity

Native White	52½%	Canadian	2½%
German	21 %	English	2½%
Other Foreign White	5 %	Negro	2½%
Austrian and Russian	5 %	Hungarian	2 %
Scandinavian	2½%	Italian	2 %
Irish	2½%		
			100 %

Ratio defects per 1,000 men

Wisconsin	465.03	Indiana	416.99
Illinois	471.25	Ohio	421.40
		Michigan	467.20

Ratio of defectives by disease.

	Wis.	Ill.	Ind.	Ohio	Mich.
Tuberculosis	22.76	23.06	24.15	21.46	22.09
Venereal	20.28	52.69	47.07	41.34	44.54
Cardio-Vascular	31.06	28.62	22.39	28.32	50.30
Developmental	28.85	28.65	29.27	25.46	22.52
Nervous and Mental Disorders	17.46	13.46	14.30	16.31	14.48

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GROUP IV.—Composed of states of Georgia, South Carolina, North Carolina, Virginia, West Virginia and Maryland.

Percentage of nativity

Native White	60 %	Italian	½%
Negro	35 %	English	½%
German	1½%	Irish	½%
Other Foreign White	1 %		
Austrian and Russian	1 %		100%

Ratio defects per 1,000 men

Georgia	455.78	North Carolina	453.89
South Carolina	422.60	West Virginia	507.38
		Virginia	604.21

Ratio of defectives by disease.

	Ga.	S. Car.	N. Car.	W. Va.	Va.	Md.
Tuberculosis	24.46	19.93	30.47	17.39	32.10	38.46
Venereal	135.64	131.32	69.56	52.67	71.21	66.73
Cardio-Vascular	34.81	25.80	27.41	18.13	31.51	46.58
Developmental	48.79	42.79	33.41	17.15	33.05	43.43
Nervous & Mental Disorders	16.72	24.24	25.91	12.97	24.13	26.07

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GROUP V.—Composed of states of Florida, Mississippi, Alabama, Tennessee and Kentucky.

Percentage of nativity

Native White	63 %	Italian	1 %
Negro	31 %	Irish	1 %
German	2 %		
Other Foreign White	2 %		100 %

Ratio defects per 1,000 men

Florida	541.60	Alabama	427.70
Mississippi	426.21	Tennessee	442.40
		Kentucky	382.10

Ratio of defectives by disease.

	Florida	Miss.	Ala.	Tenn.	Ky.
Tuberculosis	19.15	24.12	21.14	30.83	31.61
Venereal	163.32	132.46	114.67	65.16	39.53
Cardio-Vascular	24.42	21.75	22.07	31.10	18.34
Developmental	44.11	24.74	29.57	51.51	42.62
Nervous and Mental Disorders	13.57	20.01	19.48	24.55	17.81

◆ ◆ ◆ ◆ ◆

GROUP VI.—Composed of states of Texas, Oklahoma, Louisiana and Arkansas.

Percentage of nativity

Native White	60 %	Austrian and Russian	1½%
Negro	25 %	Irish	1½%
German	4 %	India, China and Japan	1 %
Mexican and West Indian	2½%	Canadian	1 %
Other Foreign White	1½%	English	½%
Italian	1½%		
			100 %

Ratio defects per 1,000 men

Texas	402.40	Louisiana	438.9
Oklahoma	432.70	Arkanssa	384.2

Ratio of defectives by disease.

	Texas	Oklahoma	Louisiana	Arkansas
Tuberculosis	23.03	19.31	27.61	21.47
Venereal	112.08	85.15	121.40	105.28
Cardio-Vascular	16.72	16.34	23.86	16.76
Developmental	28.74	23.31	37.22	26.16
Nervous and Mental Disorders	12.34	15.45	26.76	14.26

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GROUP VII.—Composed of states of North Dakota, South Dakota, Nebraska, Kansas, Missouri, Iowa and Minnesota.

Percentage of nativity

Native White	55 %	Negro	2½%
German	15 %	Canadian	2 %
Scandinavian	10 %	Mexican and West Indian	1½%
Other Foreign White	5 %	Scotch	1 %
Austrian and Russian	4 %	India, China and Japan	½%
Irish	3½%		
			100 %

Ratio defects per 1,000 men

North Dakota	438.	Kansas	354.35
South Dakota	373.2	Missouri	489.
Nebraska	386.99	Iowa	425.78

Ratio of defectives by disease.

	N. D.	S. D.	Nebr..	Kas.	Mo.	Iowa	Minn.
Tuberculosis	14.30	16.97	12.41	19.21	26.18	17.15	18.42
Venereal	18.64	15.60	30.97	30.07	65.24	29.87	24.20
Cardio-Vascular	24.46	27.30	18.52	18.74	30.71	27.37	27.10
Developmental	12.88	16.99	15.67	16.69	34.75	30.11	22.48
Nervous and Mental Disorders	13.68	17.90	11.21	16.27	17.76	19.59	14.48

GROUP VIII.—Composed states of Montana, Wyoming, Nevada, Idaho, Utah, Arizona, Colorado and New Mexico.

Percentage of nativity

Native White	52½%	Irish	3 %
Other Foreign White	10 %	Mexican and West Indian	3 %
English	6 %	Italian	2½%
Hungarian	5 %	Scotch	2 %
German	5 %	Austrian and Russian	2 %
India, China and Japan	3½%	Negro	2 %
Canadian	3½%		
			100 %

Ratio defects per 1,000 men

Montana	456.7	Utah	505.82
Wyoming	465.03	Arizona	410.01
Nevada	476.	Colorado	544.97
Idaho	479.26	New Mexico	458.22

Ratio of defectives by disease.

	Mont.	Wyo.	Nev.	Idaho	Utah	Ariz.	Colo.	N. M.
Tuberculosis	13.37	11.90	19.92	16.11	15.68	66.58	57.49	63.54
Venereal	34.49	23.37	32.96	22.45	19.28	48.20	24.60	67.43
Cardio-Vascular	26.34	16.29	28.08	29.87	54.60	24.79	26.92	18.51
Developmental	15.86	19.44	32.51	21.86	32.46	15.19	34.81	34.89
Nerv. & Mental Disorders	5.56	5.42	3.36	8.26	9.57	4.09	11.93	14.72

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GROUP IX.—Composed of states of Washington, Oregon and California.

Percentage of nativity

Native White	50 %	Scandinavian	5 %
Other Foreign White	12½%	Italian	5 %
German	8 %	Scotch	2½%
India, China and Japan	5 %	Austrian and Russian	1½%
Canadian	5 %	Negro	1 %
Irish	5 %		
			100 %

Ratio defects per 1,000 men

Washington	549.41	Oregon	579.59
		California	583.89

Ratio of defectives by disease.

	Washington	Oregon	California
Tuberculosis	28.19	24.49	47.14
Venereal	28.93	22.28	27.58
Cardio-Vascular	68.84	39.90	39.94
Developmental	29.31	27.18	45.91
Nervous and Mental Disorders	12.28	12.38	11.75

New Equipment

THE VICTOR-KEARSLEY STABILIZER

THIS device means much to the roentgenologist, for it eliminates a factor of inconsistency which is experienced in the operation of Coolidge tubes on practically every voltage supply circuit.

This inconsistency is not due to any shortcomings within the tube itself, but rather to the surrounding conditions, that is, fluctuations in the line supplying the filament circuit. As is well known, the passage of current through a Coolidge tube is dependent upon the heat of the filament, and the control of amount of current through the tube is by varying the heat of the filament. An increase of current through the filament circuit means an increase of current through the tube.

The operating range of the Coolidge tube is at filament temperatures of from 2050 C to approximately 2300 C. Because of these comparatively narrow limits, a slight change in line voltage in the filament circuit will bring about a very great change in tube circuit. This explains why two consecutive radiographs, using the same technique, are frequently so different in diagnostic qualities when line voltage fluctuates.

The Victor-Kearsley Stabilizer is an instrument designed to maintain a constant tube current over a line voltage variation at the filament transformer. By its means the heat of the filament is maintained at the required temperature to permit a desired amount of current through the tube Should a line voltage fluctuation occur, this stabilizer automatically causes a change of temperature in the tube filament, to equalize the fluctuation and thus hold the tube current constant.

The device is placed in the high tension circuit, therefore, adaptable for use regardless of the low tension voltage supply or frequency.

The range of control is from 2 ma. to 100 ma. tube current. The setting for the desired tube current is made

with the insulated handle at the lower end of the stabilizer.

This instrument can be used with any interrupterless x-ray apparatus and the Coolidge tube. It can be immediately cut out of the high tension system when it is desired to use the regular Coolidge filament control, as, for instance, in fluoroscopy.

Every roentgenologist will welcome this wonderful aid in his work. It insures uniformity in radiographic results and will save considerable in plate costs, also the time consumed in making additional exposures. For therapy it is of vital importance, in that it enables the operator to make his setting for the desired current and know that the stabilizer will maintain that current for any period of time. Its value for administering exact dosage is, therefore, obvious.

The main elements of the stabilizer consist of the following:

1. A vibrating relay, which tends to hold the filament current constant regardless of change in voltage.
2. A limiting relay, which prevents heavy current surges through the tube at the time of closing the x-ray switch.
3. A fixed resistance in each relay circuit.
4. A regulating mechanism which is adjustable by hand to obtain any desired tube current within the range of the stabilizer.
5. An on and off switch.

SWEETBRIAR SCREENS

A WORD or two concerning the history of Sweetbriar Screens may be interesting to the average radiologist, perhaps too much inclined to expect a great deal of manufacturers of various appliances and then not appreciate the rendition of indefatigable service in the perfection of an apparatus.

The Sweetbriar Screen was designed by a Mr. Smith, an English gentleman, who completed his college course in England just a few weeks after the x-ray was first discovered. Shortly thereafter, Mr. Smith came to the United States and has been actively identified with x-ray work ever since. He begun the manufacture of fluorescent screens of platinum-barium-cyanide in 1906, marketing them through dealers under such labels as they directed. About four years ago, Mr. Smith determined to market his own product.

At a meeting in Saratoga in 1919, Mr. Smith exhibited some screens having remarkable qualities, in that they could be put into developer or fixer and be washed and used again without the screen being in any way injured. They could also be put on the floor and jumped on without showing any marks. These screens are extremely difficult of manufacture, and the Sweetbriar Laboratories are not yet prepared to place them on the market as a regular product, though it is hoped they will accomplish this in the not too far distant future.

The Sweetbriar Laboratories divide screens into two classes—those which have the calcium tungstate mounted in such a way that it is porous, so that any drop of developer or fixer destroys the calcium tungstate completely through the screen where it touches, and those that are so mounted the mounting medium closes all pores in such a way that a drop of developer or fixer will destroy only such particles of calcium tungstate as are actually exposed where the drop falls. Screens of the latter class are not destroyed and are scarcely injured by developer or fixer if immediately cleaned off.

Sweetbriar screens are of the non-porous variety. They can be distinguished from the porous by their high gloss. The filling of the pores produces a screen which is more durable and of slightly slower speed Sweet-

brilliant Screens are guaranteed to have absolutely no grain. They are usually shipped as folders. They are very flexible, and in this form are easier to handle and make better contact. They are also easier to clean, since they can be lifted from the cassette and opened flat on a table.

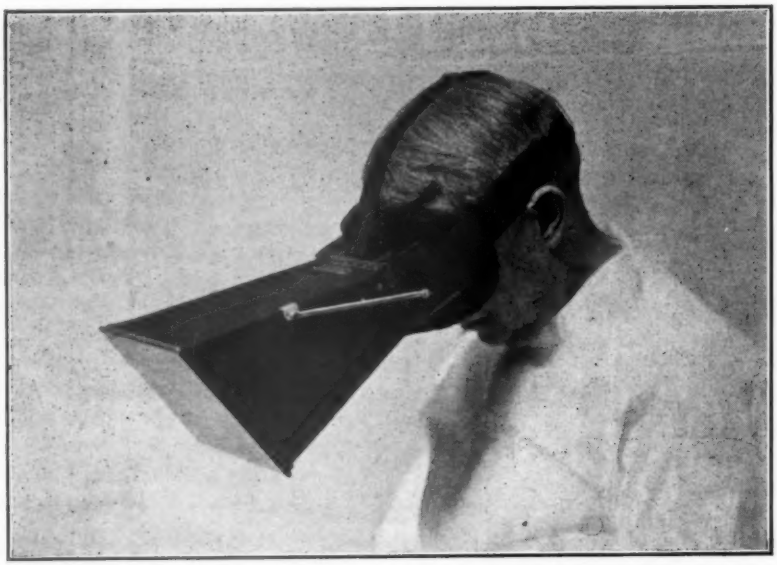
WAPPLER PORTABLE X-RAY UNIT

RADIOLOGISTS will be interested in the Wappler Portable X-Ray Unit, because frequently it is neither possible nor advisable to move the patient to plant for observation or treatment. With this unit, work can be done equally satisfactorily in the private home and hospital ward as in the laboratory. It is really a bedside unit. It is also so efficient as to serve as an auxiliary unit at the office when other units are busy. And for the physician or surgeon inaccessible to an x-ray laboratory, the Wappler Portable is an ideal unit for use in minor cases. The distinction minor is made, not because the unit under discussion is inefficient, but because in cases of major importance, the physician or surgeon prefers to refer his patients to an experienced radiologist for diagnosis and treatment.

The need for such a unit is great and it will add materially to the rendition of larger service by the profession.

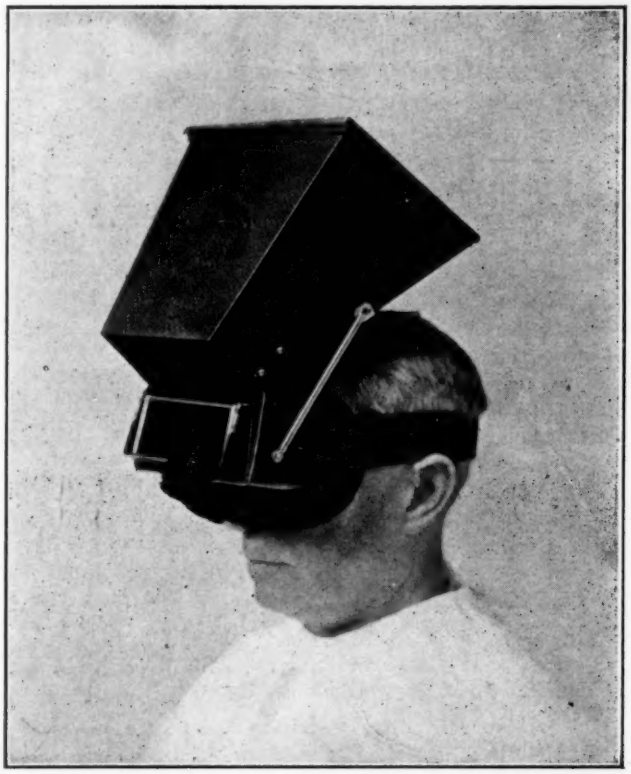
PATTERSON OPERATING FLUOROSCOPE

ONE of the distinct accomplishments in x-ray science, from the equipment side, which may be accredited to the necessities of war, is the device developed by a French roentgenologist, and now manufactured and sold by The Patterson Screen Company.



The advantages of The Patterson Operating Fluoroscope for the busy radiologist will occur without detailing them here. It is sufficient to direct attention to the two figures; and

to say that the weight of this fluoroscope is but a few ounces. It is adjusted to any head by the elastic bands—the eye piece is fitted with soft material, which conforms to the contour of the nose and forehead, closing out all external light, and is hinged so that it can be tilted back against the head, as shown in figure two when not in use. When tilted back, a piece of ruby glass automatically falls down in front of the eye piece protecting the accommodation of the eyes. It is equipped with a 5-inch by 7-inch Patterson Fluoroscopic Screen and protected by the best quality of polished and ground lead glass.



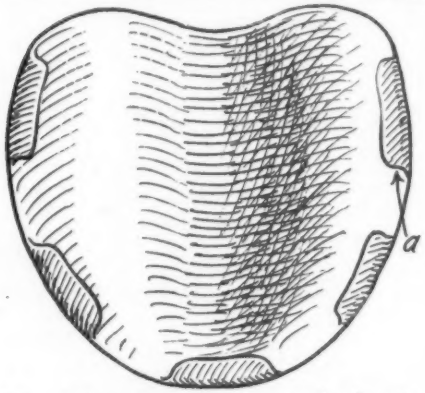
Department of Technique

A NEW METHOD OF HOLDING THE FILM IN THE MOUTH

J. De'Voine Guyot, M. D.
Bucklin, Mo.

I THINK that practically every device that has been put on the market for the purpose of holding the film in the mouth of the patient has been abandoned in favor of the old simple finger method. I have tried all I have ever heard of or have seen without any great degree of satisfaction, and I believe that has been the experience of everyone doing dental radiography.

Recently I developed a holder for use with the upper jaw that is giving me a great deal of satisfaction and has the advantage of being cheap,



a- Edge turned back to hold edge of Film. About ¼ inch fold is enough

simple and permits the film to be placed in the desired position before inserting in the mouth and it will stay where it is put.

From a heavy piece of sheet dental gutta percha make a plate to conform to the general contour of the roof of the mouth, allowing the margins to project slightly (¼-inch) beyond the teeth. This can be easily done if the material is immersed in warm water. Trim the plate on its posterior edge so that it will not impinge on the tissues at the back of the mouth and cause gagging. Turn back portions of the edge that was left to project beyond the teeth, and bend them sharply against the palatal surface of the plate. Two on each side and one in front are sufficient. The intervening material may then be cut away. These serve to hold the film in place when it's edge is slipped under them.

The film is placed with its edge under one of these turned back portions, the plate inserted in the mouth and the patient instructed to make pressure on the centre of the plate with the thumb or finger while the exposure is being made.

The film will not slip down or rotate and the next film can be easily placed in its proper relative position, overlapping is avoided and my patients insist that it is far more comfortable than using simply the finger.

I have several sizes of the plates and am getting better results with less effort than ever before. I am still using, for want of something better, the finger with the lower jaw, but am in hopes that eventually something better will show up.

With the hopes that others may find this method as useful as I have, I take pleasure in commending it to you for a trial.

DEVICE FOR MARKING PLATES

H. L. Bernheimer, M. D.,
Terra Haute, Indiana.

FOR some time I have been using a device for marking plates which has proven so simple and practical in my hands that a number of my col-

leagues have remarked about it. It does away with re-handling of numbers and there is no chance of losing the numbers, because they are used but once. The device is one of the old check perforators made by the

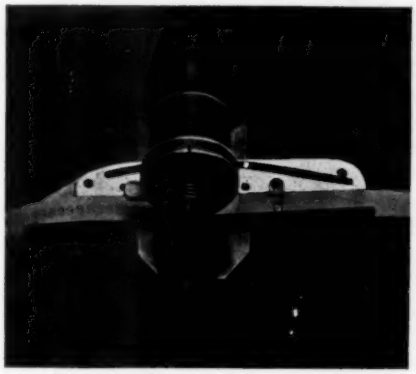


Fig. 1—Showing the check perforating machine fitted with a track which will take a strip of tin foil three quarters of an inch wide. On the left hand side the foil has already been perforated, while on the right hand side no perforation has been made.

B. F. Cummings Company of Chicago. No doubt, there are others on the market that will do similar work.

As you will see in Figure 1, I have added on the base of the check marker a track so that tin foil cut three-quarters of an inch wide is kept in a straight line while being perforated with the numbers. Any length of foil

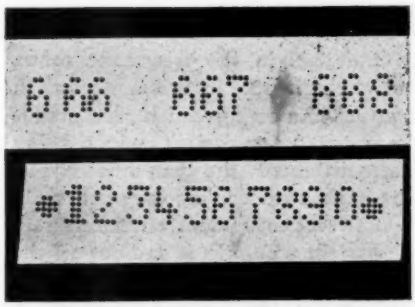


Fig. 2—Print showing the appearance of the numbers on the x-ray plate.

may be used, so that as many numbers as you wish may be perforated on it. After the perforation has been made, the foil is rolled up so as you use it all you need to do is to cut off the number, use it on the plate and then discard it.

A SIMPLE METHOD FOR KEEPING EFFICIENT RECORDS IN ROENTGENOTHERAPY

J. Thompson Stevens, M. D.,
Montclair, N. J.

IT IS, I believe, generally recognized that the records kept in most roentgenotherapeutic laboratories are totally inadequate where any great degree of accurate, scientific work is to be desired. I realize that the above statement is not true in all cases, for I have seen the records of a few of the men which meet the most exacting requirements. In my own case, however, I know that in the past my records were at times not of much value, particularly when several months had lapsed since the last visit of the patient. The record here offered, I think, will meet any and all requirements with entire satisfaction. At a glance the roentgenotherapeutist can tell exactly what was done at the last visit of his patient.

The chart is prepared upon a flexible cardboard, flexible enough so that it can be easily run through a typewriter. Cardboard was chosen as it is more resistent to repeated handling than paper. The size of the cardboard is 8½x11 inches. Only one side of the cardboard is ruled as shown, the other side is left plain upon which the history of the case can be typed, also the physical findings, etc., and the clinical course of the case.

Columns marked date and area need no explanation. Columns Tube and App. mean tube and apparatus. All who are doing much roentgenotherapeutic work well know that machines

and tubes of the same make often vary within wide limits as to their output in spite of the fact that the treatment factors were always the same. Here tubes and machines are numbered and the apparatus used in

a given treatment is recorded by number in the columns marked Tube and App.

Distance refers to focal distance, M. A. means milliamperage used, Voltage can be recorded either in terms of spark-gap or direct voltage whichever method seems most useful to the roentgenotherapeutist, Filter is recorded as kind and thickness of filter, Time means length of exposure, Reaction provides for a record of the effect the rays had on the skin, Operator provides for signature of the one who actually did the work.

Here in my laboratory the cards are filed in envelopes of proper size. Any roentgenograms or photographs taken before, during, and after treatment can be cut and filed in the same envelope. The roentgenograms must be taken on films for use as just described. Letters and copies of letters regarding the case are filed in the same envelope along with laboratory and other reports that one may have.

In conclusion I wish to state that for the past few months I have never been in doubt as to exactly what the patient had done at his last visit, nor have I had to ask the patient a question or two to clarify my records. I presume that some of us have records even better than the one I have just described. I am offering this one hoping that it will help some one to better judgment for dosages in the future, and therefore to better results from the patient's standpoint as well as that of the roentgenotherapeutist. In my hands this record is easy to keep, as well as being the most efficient one I have ever seen.

TREATMENT SAFETY DEVICE

EVERY ONE who is doing x-ray therapy, and especially deep therapy, is very much impressed with the need of some sort of safety device so that the current can be quickly shut off in case of necessity. Although the patient is constantly under observation, there is frequent need for stopping the current and the patient may not be able to signal in a satisfactory manner, or if it is attempted the patient may come in contact with the high tension wires.

Dr. E. C. Ernst of St. Louis, Mo., has installed a simple device which appeals to us as not only accomplishing the desires of the radiologist, but as one which will inspire the confidence of the patient, since by the employment of this device the patient is the one who controls the shutting off of the current. This gives patients a degree of confidence which they do not otherwise have.

The device is a knife switch placed on the wall in the treatment room, and to the handle of this knife switch is attached a string which runs across the room to the patient, a loop being fastened about the patient's finger. The knife switch is set very delicately so the least movement on the part of the patient will open it and cut off the current. The switch is connected into the primary circuit of the transformer, a line being taken from the control board to the switch.

A SIMPLE METHOD FOR THE PREVENTION OF PUNCTURE OF THE COOLIDGE TUBE BY "STATIC" DURING DEEP THERAPY.

J. Thompson Stevens, Montclair, N. J.

I HAVE READ with interest and profit the article published in "The Journal of Radiology," June, 1921, by Dr. R. H. Stevens of Detroit, Mich., and was particularly interested in his expression of his reasons for using glass for filters. With his type of wooden tube stand, I believe that his method for protection of the Coolidge tube against puncture by means of glass filters cannot be improved upon, but for those of us who are using the ordinary stand, made of metal and glass, the method of Dr. Stevens would not probably be as satisfactory as it has been in his hands.

If glass in the common American made stand is placed in the usual filter slot, it will be found that there is a metal support upon which the lead glass bowl rests, which will be left uninsulated, between the tube and the layer of glass. In my own stand, this metal which came into the field was a frequent cause of puncture, and even before the tube broke down the glass of the tube was discolored, the discoloration taking the form of a ring the position of which was exactly above the metal upon which the lead glass bowl was supported. This is what I have done and the results have been one hundred per cent perfect to date. I have punctured no tubes in the last few months since using this method and none of the tubes are discolored.

I first removed the lead glass bowl from its support. A piece of pure glass one-sixteenth of an inch thick of proper diameter was cut so that when the lead glass bowl was replaced, the insulator glass was large enough so that it would extend to the outer edge of the outlet of the lead glass bowl. This gives us the following arrangement: metal support for lead glass bowl upon which is placed the layer of glass, the insulator; and finally the lead glass bowl is placed upon the layer of glass and clamped properly. Now the tube is entirely surrounded by glass, no metal enters into the field anywhere. One may now use in the usual filter slots either aluminum, copper, or glass to make up any desired filter in a given case with no danger of tube puncture when the metal filters are used. The layer of glass used as an insulator must be counted as a filter. Glass and one millimeter of aluminum I have found to be about equal in filter value. Glass for insulator should be one-sixteenth of an inch thick, and in my stand, five and a half inches in diameter was necessary.

Abstracts and Reviews

The purpose of this department is to furnish its readers a succinct epitome of current interesting articles and books. We will be glad to review articles which have been presented for publication or any manuscript or book sent us.

The Symptomatology and Diagnosis of Foreign Bodies in the Air and Food Passages. Chevalier Jackson. Am. Jour. Med. Sci., May, 1921; pages 625-661.

THIS article is a full and complete discussion of the subject, covering it in an exhaustive way. Coming as it does from Dr. Jackson, every one knows that about the last word has been said that is possible in the space given. The paper is based on a study of 789 cases. The following summary is transcribed, as it gives the subject in outline.

Summary of the Chief Points in the Symptomatology and Diagnosis of Foreign Body in the Air and Food Passages.

Larynx

1. Foreign bodies lodged in the larynx cause an initial laryngeal spasm which is followed by more or less laryngeal wheezing, croupy cough, and a variable degree of impairment of phonation.

2. Pain in the laryngeal region may be present and is sometimes referred to the ears.

3. The larynx may tolerate a thin, flat foreign body for a relatively long period of time, but the development of increasing dyspnea renders early removal imperative in the majority of cases.

Trachea

4. Tracheal foreign bodies are usually movable and their movements can usually be felt by the patient.

5. The vibrations may be palpated and heard with the stethoscope.

6. Cough is usually present at once, may disappear for a time and recur, or may be continuous, and may be so violent as to induce vomiting.

7. Sudden shutting off of the expiratory blast and phonation during paroxysmal cough is almost pathognomonic of a movable tracheal foreign body.

8. Dyspnea is usually present and is due to the bulk of the foreign body plus the subglottic swelling caused by the traumatism of the shiftings of the intruder.

9. The asthmatoid wheeze is usually present and is often louder and of lower pitch than the asthmatoid wheeze or bronchial foreign bodies. It is heard at the mouth, not at the chest wall.

10. Pain is not a common symptom but may occur and be accurately localized by the patient.

Early Symptoms of Irritating Foreign Body (such as a peanut-kernel) in the Bronchus.

Bronchi

11. Initial laryngeal spasm is almost invariably present with foreign bodies of organic nature, such as nut kernels, peas, beans, maize, etc.

12. A diffuse purulent laryngo-tracheo-bronchitis develops within twenty-four hours in children under two years.

13. Fever, toxemia, cyanosis, dyspnea and paroxysmal cough are promptly shown.

14. The child is unable to cough up the thick mucilaginous pus through the swollen larynx and may "drown in its own secretions" unless the offender be removed.

15. Lung abscess rapidly forms.

16. The older the child the less severe the reaction.

17. In the early stages an acute obstructive emphysema is present, manifested by: (a) limited expansion, (b) muffled tympanitic percussion note, (c) markedly diminished or absent breath sounds on the obstructed side, (d) many rales and harsh breathing on the free side.

18. The radiograph confirms these signs by showing (a) greater transparency on the obstructed side, (b) displacement of the heart toward the free side, (c) depression and limitation of the diaphragmatic movement on the obstructed side.

Symptoms of Prolonged Foreign Body Sojourn.

Bronchi

19. The time of inhalation of a foreign body may be unknown or forgotten.

20. Cough and purulent expectoration ultimately result, although there may be a protracted delusive symptomless interval.

21. Periodic attacks of fever, with chills and sweats and followed by increased coughing and the expulsion of a large amount of purulent, usually more or less foul material, are so nearly diagnostic of foreign body as to call for exclusion of this probability with the utmost care.

22. Emaciation, clubbing of the fingers and toes, night-sweats, hemoptysis, in fact, all of the symptoms of tuberculosis are in most cases simulated with exactitude, even to the gain in weight by an outdoor regimen.

23. Tubercle bacilli have never been found in the Bronchoscopic Clinic associated with foreign body in the bronchus. It was the only element lacking in a complete clinical picture of advanced tuberculosis. A point of difference was the rapid recovery after removal of the foreign body.

24. The erroneous statement in all of the text books that foreign body is followed by phthisis pulmonalis is an heirloom of the days when the bacillary origin of true tuberculosis was unknown, hence the foreign body phthisis pulmonalis or pseudotuberculosis was confused with the true pulmonary tuberculosis of bacillary origin.

25. The subjective sensation of pain may allow the patient to localize a foreign body accurately.

26. Foreign bodies of metallic or organic nature may cause their peculier taste in the sputum.

27. Offensive odored sputum should always suggest bronchial foreign body; but absence of sputum, odorus or not, should not exclude foreign body.

28. Sudden complete obstruction of one main bronchus does not cause noticeable dyspnea provided its fellow is functionating.

29. Complete obstruction of a bronchus is followed by rapid onset of symptoms.

30. The pleura is rarely involved. Rib resection fone for supposed empyema have with one exception shown no pus.

31. The physical signs usually show limitation of expansion on the affected side, impairment of percussion, and lessened transmission or absence of breath sounds distal to the foreign body.

32. The "asthmatoid wheeze" may, if present, be of great diagnostic value. Its absence, however, does not negative the presence of foreign body.

33. All cases of chest disease should have the benefit of a radiographic study to exclude bronchial foreign body as an etiological factor, and negative opinions should never be based upon any plates except those of the utmost perfection, that the wonderful modern development of the art and science of roentgenology can produce. In doubtful cases, the negative opinion should not be conclusive until a roentgenologist of long and special experience in chest work has been called in consultation. Even then there will be an occasional case calling for diagnostic bronchoscopy.

34. Symptoms of pulmonary abscess, or other lung disease, even cough, following within a few weeks of the extraction of teeth, call for the exclusion of foreign body in the lung.

Esophagus

35. There are no absolutely diagnostic symptoms of esophageal foreign body.

36. Dysphagia, however, is the most constant complaint, varying in degree with the size of the foreign body and the degree of inflammatory or spasmodic reaction produced.

37. Pain may be caused by the penetration of a sharp foreign body, by inflammation secondary thereto, by impaction of a large object or by spasmodic closure of the hiatal sphincter.

38. The objective sensation of foreign body is usually present but cannot be relied upon as assuring the presence of a foreign body, for it is present for a time after the passage of the intruder.

39. All of these symptoms may exist, oftener in most intense degree, from previous violent attempts at removal and the foreign body may or may not be present.

40. Fluoroscopic study of the swallowing function with barium mixture or capsule will give the location of a foreign body which may not be radiopaque.

41. Anteroposterior and lateral roentgenograms should always be made.

42. The value of a radiograph after the removal of the foreign body cannot be too strongly emphasized.

Stomach

Foreign body in the stomach ordinarily produces no symptoms. The roentgenogram and the fluoroscopic study with an opaque mixture are the chief means of diagnosis.

E. W. ROWE.

Treatment of Carcinoma of the Tongue. Douglas Quick, New York City. Annals of Surgery, June, 1921, page 716.

CARCINOMA of the tongue is the most difficult type of malignant disease to treat. Clinical courses are various. The rich vascular supply explains the rapid growth and metastases. Average duration of life is two years. Fatal termination varies from 75 to 90 per cent. The cases are coming for treatment earlier, but 25 per cent only are operable when they are first seen. The nearer the initial lesion to the base, the more hopeless it is. Various surgical reports are given to show the mortality of operation and the expectancy of life and cures.

Treatment of the Primary Lesion

This field belongs entirely to radium. Later developments in the application of radium by buried emanations have greatly improved the results. Surface radiation has been abandoned except in a few selected cases. Buried emanations are given to the bulk of the cases. The capillary tube used contains one millicurie. These are buried throughout the growth by means of a fine trocar needle. The amount varies with the size and the shape. It is most necessary to place these adequately. This method gives prolonged exposures of beta and gamma rays filtered only through the glass. The radium element gives mostly gamma rays, which are less efficient. The tissue reaction and trauma is less with emanations: also the distribution is more even. The effects last for a long period. In eight days there is still present about one-fourth of the activity.

Treatment of the Cervical Nodes

Metastases as a rule is late in the lymphatics of the neck. Unless it is definitely present, surgery should not be applied. Removal of the glands, even by block dissection, does not remove all involved glands and it does remove one of nature's barriers which it is important to conserve. Extension to the lymph glands is embolic. If no glands are present, the treatment of the neck is by radiation. If they are present a dissection is made and emanations are introduced in the wound, as well as in all suspicious points. Where the cancer has burst the gland capsule, the glands are not removed, but are treated by radium emanations; thus the natural barriers are preserved.

Statistics

Number of cases treated, 148 cancers of tongue.

Number in men, 90.5 per cent.

Number in women, 9.5 per cent.

History of syphilis or Wasserman positive, 35.1 per cent.

Average duration, 6.72 months.

Primary growths without nodes, 45.8 per cent.

Of these there are now free, after two months to three years, 85 per cent.

Of these, five developed cervical metastases.

Of these, verified by microscope, the number is 88.2 per cent.

The total number of cases treated in the hospital give a somewhat different report to this selected group. But in both groups there are now clinically free sixty-one cases, or 41 per cent of all the local lesions showing retrogression. There are nineteen cases showing improvement, but not yet free from disease.

Conclusions

1. The primary lesion in cancer of the tongue should be handled entirely by radium.

2. Buried emanations is the method of choice.

3. Cervical nodes should be treated conservatively:

(a) External radiation if there is no gland involvement.

(b) If there is involvement, external radiation followed by surgery,

and again treatment by buried emanations.

4. While time is too short to compare with surgery, yet it is believed that this form of treatment in unselected cases will yield a higher percentage of clinical cures than will surgery alone in selected operable groups.

E. W. ROWE.

The Present Position of Radium in the Study and Treatment of Uterine Cancer. William S. Stone, New York. Surgery, Gynecology and Obstetrics, June, 1921, page 509.

SO MUCH evidence is arising as to the value of radium in the treatment of uterine cancer that the question arises whether it is not more effective than operation. Radium has assumed an importance in cancer research. The histological studies made have added a great deal to our knowledge. The action of radium in the uterus is the same as in other parts of the body. That is, the tissues respond according to the type. Embryonal and rapidly growing kinds are the most responsive; the glandular more so than the epithelial. Disappearance of cells or lymphocytic invasion and fibrosis take place. This destruction may, if the dose is too great, extend to normal tissue, causing necrosis. Clinically, reparation after the use of radium takes place so regularly that its action is looked upon as specific.

Palliation in advanced cases is marked. Occasionally retrogression is complete. The writer quotes from 400 cases of uterine cancer which he has observed.

Radium in all recurrences produces much greater benefit than surgery, provided they are not too closely related to the bladder and rectum. The earlier the cases the better the results. Pain and hemorrhage may be relieved even if there is no idea of cure, or if there is considerable retrogression. The x-ray may be substituted for treatment over the abdomen. The embedding of emanation needles is giving encouraging results.

Operation has been performed by eminent surgeons with a degree of success, but this success has been low in ordinary hands. Operation has been performed to an unjustifiable extent, producing suffering and mortality and bringing discredit both to operators and all other sincere efforts to cure the disease. When a competent diagnostician receives a case, palation is usually the only procedure justified. For all cases of primary uterine cancer, therefore, with few exceptions, radium should be the method of choice. Of thirty-four cases treated in the Memorial Hospital coming within three months after the beginning of symptoms, a primary and complete regression was obtained in sixteen, or 47 per cent; and a partial but substantial regression in all the remainder. Of the sixteen cases in which regression was complete, the growth was limited apparently to the uterine tissues in three, and in the remainder the extrauterine involvement was not extensive.

Of another thirty-four cases coming in from four to six months, the advancement was greater. In three a regression was obtained with the growth limited to the uterine tissues. In eighteen cases, or 50 per cent, the regression was not complete. The restoration to normal health for a time, however, showed its value. There was no improvement in a few. Two were made worse. Time only can tell the ultimate result. Numerous cases in this series are apparently well two or more years after treatment.

The question of radium in borderline cases is decided strongly in its favor. Properly applied, radium will destroy all cancer cells in the uterus, and as far around as surgery can reach. Cases outside operability are frequently made to be within the range of operation after radiation.

It is a mistake to use radium as an adjunct to surgery in advanced cases. It should be a substitute, because cutting through uterine cancer cells causes them to scatter and increases the rapidity of growth.

Radium should be used as a prophylactic measure. There are numerous cases where first bulky and necrotic growths may be removed by cautery and then the radium applied. The subsequent application of radium to the tumor base may increase the permanency of the result, as often the parametrial invasion is not commensurate with the apparent extent of the original lesion.

Two unfortunate cases in which recurrence followed in what seemed to be curable cases cause the writer to

hesitate to say that those patients with involvement in the uterus only should be treated by radium alone. In these cases radium, one to two weeks prior to operation, will improve the results.

Because we cannot control by radium or x-ray the lymph node involvement in early cancer, it is not best to supplant surgery by radium. But radium prior to operation is advisable. Seven such cases have been treated by radium alone without signs of recurrence. Three of these have gone for more than three years.

In regard to the work of those having small amounts of radium, it may be said that it is better to use large amounts for short periods than small amounts for longer periods. The value of applying x-ray or radium to the abdominal wall has not been determined. Beta radiation must be avoided. Gamma rays are by far the most active and beneficial.

In general, the chief error in the use of radium is over-dose.

A strong plea is made to avoid treating those cases too far advanced. Such methods bring discredit in the eyes of the public.

E. W. ROWE.

Splinters of Glass in the Face and Skull Revealed by the Roentgen Ray. Report by Charles G. Sutherland, M. B., Rochester, Minnesota.

CASE 1. This was a male patient who noticed, thirteen months after his accident, a discharge from a point near the temple and also he could feel a sharp foreign body. The x-ray demonstrated plainly a triangular piece of glass under the skin, which was successfully removed. The foreign body had caused great suffering and several mistaken diagnoses.

Case 2. This patient was more seriously injured, and aside from an evident injury to the brain there was the roentgen evidence of a splinter of bone in the posterior portion of the brain. The patient's condition was poor. He had been operated once. No further operation was advised. He died two weeks later.

The literature does not contain any reference to glass in tissues. Roentgenological search for glass is never hopeless.

E. W. ROWE.

Present Status of the Treatment of Operable Cancer of the Cervix. By William P. Graves, Boston. Surgery, Gynecology and Obstetrics, June, 1921, page 504.

THE Wertheim operation for cancer of the uterus was much in vogue a few years ago and is still used, somewhat modified by surgeons who have been persistent in removing uterine cancer by surgery. Radium has had a recent boom in popularity. Its use has been partly limited by the scarcity of the element. Many excellent gynecologists have had to work without it. Undoubted cures have been recorded from radium. Radicals are proclaiming the "death knell" of the operation. The immense value as a palliative was early established. The question now under consideration is whether we are justified in resorting to the simple application of radium is cases that are frankly operable, and in which an ultimate cure by surgical means is reasonably possible.

The first experience was obtained in the Huntington Hospital and the Free Hospital for Women. The results, summarized, are:

1. Of the inoperable and borderline cases sent, none was permanently cured, though many were very much benefited.

2. Several inoperable cases were made operable and lived in comfort many months.

3. A number of recurrence cases treated were benefitted very much.

4. Prophylactic treatment following operation after several trials was given up on account of the danger of burns, and later, fistula.

In 1916 the hospital purchased 100 m.g. of radium, and since then they have learned better technique and have had less trouble with the disagreeable sequellae. The latest experience may be given thus:

1. So far they have not a single radium cure of inoperable cancer of the cervix.

2. Evidence is obtainable that cancer of the cervix is curable by the use of radium.

3. Some of their cases now clinically cured may prove to be definitely cured.

4. In view of the uncertain and sometimes treacherous behavior of radium in the treatment of inoperable

cases, they have not felt justified in substituting it for radical surgery in cases favorable for operation.

Surgical Aspect of Cervical Cancer

Sixty-four per cent of the cases applying for relief are granted operation.

The mortality resulting from operation is five per cent.

The five-year curability is 27.6 to 34.2 per cent.

The absolute curability is 16.8 to 18.5 per cent.

In 101 out of 119 operations the Wertheim technique was carried out more or less completely.

The percentage of postoperative fistula is one and seven-tenths.

These statistics are not spectacular, but are offered because they represent a fair index of the present status of the surgical treatment of operable cancer of the cervix.

The operability of their cases is high because the institution naturally draws a large number of patients that are operable, since their clinic is devoted entirely to gynecological cases. He admits there may be a judicial shirking in the selection of cases for operation. There is a denial that the majority of operations for cervical cancer are followed by distressing and desperate sequelae. Burns occur when radium is used. When such burns follow treatment the results are desperate; large holes are made into the vagina and rectum, and usually remain hopeless. If fistulous openings follow surgery they are small and generally can be repaired.

The radical operation is not too difficult for practical use. The reckless, extensive surgery attempted by some is not necessary.

Conservation in surgical treatment of cervical cancer has been made more rational by the advent of radium, for the surgeon no longer feels able to attack the desperately difficult cases. Cases found too desperate for surgery on operation may be abandoned for radium. Postoperative radiation prolongs life.

Education of the public is bringing cancer of the cervix for earlier operation. The number of permanent cures is increasing. Cancer of the cervix is amenable to curative treatment in the early stages. Earlier detection is the measure of hope.

E. W. ROWE.

Chronic Pulmonary Tuberculosis, Primary in the Lower Lobe. Joseph Rosenblatt, Bedford Hills, N. Y. Jour. A. M. A., June 11, 1921.

"CHRONIC pulmonary tuberculosis primarily in the lower lobe is rather a rare occurrence—so rare, indeed, that many good clinicians assert that such a condition never occurs."

A brief discussion follows these opening remarks of authorities who confirm this view. Three case histories of patients are given which are chosen from a thousand consecutive cases of pulmonary tuberculosis which have entered the Bedford Sanatorium. Only the three were definitely proven to be primarily lower-lobe cases. The history, physical findings, sputum and roentgen findings were all positive. In one there was extensive cavitation. Repeated search failed to find anything in the upper lobes in this one. In the other two the extension upward was observed. It is not wise to wait for a positive sputum, for in one of these cases it was a year before tubercle bacilli were found.

Paramount importance is given to the value of the roentgen evidence. Lower-lobe lesions are clinically hard to distinguish from non-tuberculous lesions. Roentgenologically the differential diagnosis is easy. Often the roentgen findings are pathonomonic. Tuberculous lesions of the extent found to cause consideration of bronchiectasis are never difficult with the roentgen ray. The same is true of pulmonary abscess or neoplasm. Roentgen examination is absolutely indicated.

E. W. ROWE.

Radium. C. J. Broeman, Cincinnati, Ohio. Kentucky State Medical Journal, June, 1921.

RADIUM was discovered in 1898 by Madame Curie. It is extracted from a number of radio-active ores, and there are now in existence about three ounces. The radium used therapeutically is not the element itself, but one of its bulkier salts or a gaseous emanation. There are three kinds of radium ray's, but the Gamma having a selective action upon the diseased cells, is the most important in medical work.

Plaques, tubes and needles are used to convey the element to the point of application. The application is painless, and is usually followed by a reaction, sometimes severe and very painful. Much skill and judgment on the part of the operator are necessary to make this reaction as mild as possible.

1. The author calls attention to the fact that the popular impression that radium treatments are very expensive is far from the truth. The patient saves considerable time and money because no extended sojourn to the hospital is necessary. There is very little interruption to his or her regular duties. Treatments are painless and there is no period of convalescence.

2. Radium is the ideal treatment for all forms of basal-celled epithelioma and for prickle-celled epithelioma, if seen early enough, and no glandular involvement is present.

3. In carcinoma of the lip it is the treatment of choice when the case is seen early.

4. Radium is to be preferred in certain uncomplicated cases of uterine fibroid and bleeding.

5. Radium should be universally used in cancer of the cervix and inoperable cancer of the body of the uterus.

6. In all forms of inoperable cancer it relieves pain and hemorrhage and lessens discharge.

7. Radium is to be preferred to the x-ray in cases of goiter because of its exact dosage, deeper penetration and ease of application.

8. It is the preferred treatment in tuberculous adenitis and vernal or spring catarrh, while certain systemic diseases, such as splenomedullary-leukemia, pernicious anemia, and Hodgkin's disease, radium therapy has proven beneficial.

9. In dermatology radium improves and eradicates many heretofore stubborn and incurable dermatological conditions, among which may be mentioned agioma, lymphangioma, keloids, lupus erythematosis and vulgairs, intractable pruritis, chronic eczema of the mucous membrane of the lips, warts, sycosis vulgaris, localized eczema, leucoplakia, extensive hypertrichosis and other skin affections.

10. From my own experience I feel justified in affirming that radium is here to stay, and that the physician who is not willing to recognize its value to medical science is simply refusing to read the handwriting upon the wall.

Cancer of the Uterus. John B. Deaver, Philadelphia. Am. Jr. Med. Sci., May, 1921, page 661.

THE problem of cancer is unsolved, but there is hope. There are some indications that the surgeon may have to "lay down his knife" so far as cancer is concerned and "make room for radiotherapy, either roentgen ray or radium, or a combination of the two." He agrees with the English point of view expressed thus: "When the pen has superseded the sword, the scalpel will still be needed for myoma." And this he believes is true with cancer of the uterus.

The early symptoms of carcinoma of the uterus and the pathological changes are succinctly stated.

In the presence of undoubted cancer, hysterectomy is as sure a way as any to cure the disease. He disagrees with the radiologists that early cases without metastases should be treated by radium. His experience is that the disease recurs. But since radiotherapy is new, he has hope for improvement in technique and greater success in cures.

He thinks that the surgeon sees so many failures in the use of radium that he is liable to be prejudiced against its use. He reports twenty-seven cases of cancer of the uterus operated by him since January, 1916. without a mortality. Nothing whatever is given on the outcome of these cases.

E. W. ROWE.

X-Ray Treatment of Tonsils and Adenoids Associated with Exopthalmic Goiter and Tubercular Glands. W. D. Witherbee, New York. X-Ray Bulletin, Treasury Department, Washington; June 15, 1921, page 83.

THE technique used in the treatment of tonsils is as follows:

Factors: One-inch spark gap, 5 m. a., 10" distance, 4' time, filtered 3 mm. of aluminum, two weeks' intervals until results are obtained. The dosage for children is reduced accordingly. The patient is placed prone, with the

head first to one side and then to the other.

The effect of the x-ray is beneficial on the accessory tonsils and lmyphoid tissue in the pharynx.

In the treatment of goiter the tonsils are included in the technique. In tuberculosis glands the tonsils are also included. In thirty out of thirty-six cases, haemolytic streptococci and staphlococci were eliminated from the crypts four weeks after one massive dose of x-ray.

In the treatment of tonsils and tuberculous glands the thyroid has never been injured. If the technic is followed carefully the skin is never burned.

E. W. ROWE.

X-Ray Treatment of Basedow's Disease. I. S. Trostler, M. D., F A. C. P. The American Physician, April, 1921.

THE thyroid gland has been called the balance wheel of metabolism and if deranged, so as to be running too fast or too slow causes a too rapid or too slow oxidation of the fuel, with the resultant upset of the balance of the economy of the body. We have too much activity on the part of some thyroid glands, producing hyperthyroidism or the thyrodoxicoses with its well-known syndrome, and with which we are more particularly interested at this time.

In this paper we are more concerned with what is the best means of slowing down the action of this over-active, over-working gland than with any other one thing.

Some cases may show improvement with the use of drugs, but decidedly less than 20 per cent can be considered curable by drug treatment, and many of these have relapses.

The patient is not a good surgical risk. Records show less than 50 per cent cured by surgery and an operative mortality of three to six per cent.

Fully 90 per cent of all cases are cured by x-ray therapy and this in about half the time surgery requires. It lessens the activity of the glandular epithelium and causes an obliterative endarteritis in the gland. We have found that it required from four to eight full dosage treatments to effect a sure. If the patient is very toxic, a full dosage treatment cannot be administered, but if not very toxic, the treatments are administered in full dosage about every twenty-one days.

In a small series of cases the thyroid area only was treated, and failure to secure the full effect resulted until the thymic region was treated, after which cures were effected in all cases experimented upon.

The damage done the heart cannot be repaired, but the process will stop where it is and medicine, hygiene and other necessary measures may be used to repair the damage as much as is possible. The nervous and gastric disturbances disappear early in the treatment, the increase in size of the thyroid gland is usually decidedly reduced in a few treatments and the exophthalmos is usually gone in a few months.

The technique will vary with the findings in each case. The x-ray therapist should be one who has had the experience and training to properly administer treatment. The possession of apparatus does not any more make a competent radio-therapist than the possession of a lot of glittering knives, retractors, etc., make a surgeon.

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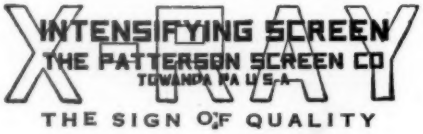

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